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THE NATURALIST.

THE
NATURALIST;

ILLUSTRATIVE OF THE

ANIMAL, VEGETABLE, AND MINERAL KINGDOMS.

WITH HIGHLY-FINISHED COLOURED ENGRAVINGS AND WOOD CUTS.

CONDUCTED BY

B. MAUND, F.L.S., AND W. HOLL, F.G.S.

VOL. I.

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THE NATURALIST.

CURSORIUS ISABELLINUS.

ORDER.—ECHASSIERS.

FAMILY.—PRESSIROSTRES.



THE SWIFTFOOT.



BY SHIRLEY PALMER, M. D.

WITH the view rather of eliciting and collecting, than of communicating, information on divers obscure parts of Zoology, I propose to give occasionally, in *The Naturalist*, a sketch of one of the rarer or more curiously constructed animals. My delineations will be taken from the best living or the most perfectly preserved specimens to which I can obtain access. I shall describe, as minutely and correctly as possible, the external characters of the subject of the sketch; and any peculiarities of internal structure, or of economy, which it may be known to exhibit: and most especially shall I feel obliged by the communication of any authentic facts respecting the anatomy, physiology, or habits of such animal, which the experienced observer may be enabled, and have the kindness, to supply. Facts,—not opinions or hypotheses, however novel or specious,—are the only contributions which I crave, or covet, on these subjects.

The description of the specific characters and habits of the animal will be followed up, if not preceded, by a sketch of the characters of that genus to which, in my opinion, it has been most correctly referred; by an enumeration of its synonyms in the leading languages of Europe; and a reference to the most accurate delineations, iconographical or literary, of the animal in question, which I have hitherto seen.

For the subject of my *First Sketch*, I have selected, the Cream-coloured Swiftfoot, *Cursorius Isabellinus*,—a bird belonging to the Order, *Echassiers*, Family, *Pressirostres*, of Cuvier; and to the *Grallatores*, *Charadriadæ*, of modern British Ornithologists.

This elegant bird,—le Coure-vite Isabelle, of Temminck,—and Corrione biondo, of Italian writers, was arranged, by Gmelin, in the Plover genus, under the title of *Charadrius Gallicus*; and is briefly noticed, but not figured, by Bewick, in his last edition of the *History of British Birds*, as the Cream-coloured Plover. It was first separated from that genus by Latham, and taken as the type of a new genus, *Cursorius*; of which the following are the distinguishing characters: Bill shorter than the head; depressed at the base; slightly arched and curved, and pointed, at the tip. Nostrils, oval, basal, lateral, and surmounted by a slightly protuberant membrane. Legs long, slender, and naked to some distance above the tarso-tibial joint. Toes three, short; all directed forwards, and united by membrane at their base: interior toe much shorter than the middle toe. Nails small; that of the middle toe broad, and pectinated on its inner margin. Naked portion of the tibia, front of the tarsus, and upper surface of the toes scutellated. Wings of mean length: first quill-feather almost as long as the second, which is longest.

The following is a correct description of a finely-preserved specimen of the adult Cream-coloured Swiftfoot, in the Birmingham Museum of Natural History:

Bill black, nearly four-fifths of an inch long. Forehead and crown of the head, pale buff-orange; changing, on the hind head, into ash- or smoke-grey. (The irides, according to Selby, are pale yellowish-grey). A white streak extending from above the middle of the eye, pointed anteriorly and growing broader as it runs backward, to unite with its fellow at the occiput. Beneath, and in contact with this, a black streak of nearly uniform width, commencing at the posterior part of the eye, and extending to meet its fellow, by an attenuated line on the posterior margin of the white band on the occiput. The occipital angle of the white streak filled up, and bordered to a short distance, by an irregularly- but somewhat crescent-shaped patch of black. Nape of the neck bright buff-orange. Whole upper parts of the body sienna-yellow, with an irregularly distributed tinge of ash-grey. Chin, throat, neck, and inferior parts, pale yellowish-white. Quill-feathers deep-brown, bordered at the extremity with buff, and reaching to the end of the tail. Tail slightly rounded, buff-orange: tail-feathers exhibiting, near the tip, a dark-brown patch much more distinctly visible on the inferior than the superior surface. Tail-coverts, above and below, light-grey. Tibiæ invested, half way down, with grey feathers. Tarsi pale buff-orange. Toes more dusky. Claws brown.

Temminck describes "the young of the year," as exhibiting, on the superior parts, a much clearer yellow colour (*isabelle beaucoup plus clair*) than the adult bird; varied, on the scapulars and wing-coverts, by numerous zigzag marks of a deeper tint. The double black streak,—or rather, as I have more correctly described it, the ordinarily black streak and crescent,—is but faintly marked in bright-brown. Such, at least, are the characters of a young Swiftfoot preserved in the cabinet of Natural History, at Darmstadt.

The Cream-coloured Swiftfoot is a native of Africa, especially Abyssinia ; and an occasional visitant only of the southern provinces of Europe. Three instances of its capture in our own island have only yet been recorded. The first specimen was shot in Kent, and sent to Dr. Latham : the second, killed in Wales, found its way into the collection of the late Professor Sibthorpe, of Oxford : the third and last, discovered at Charnwood Forest, Leicestershire, is in the possession of the Rev. Thomas Gisborne, of Yoxall Lodge ; a man equally distinguished by his eloquence as a Christian minister, and by his talents as a naturalist and a poet.

Of the food, habits, or nidification of the Swiftfoot, little is, at present, known. The individual, shot in Kent, was observed to run with incredible swiftness, and occasionally pick up something from the earth. It suffered itself to be twice shot at ; and could with difficulty be made to take wing. Its note was unlike that of any known bird.

For figures and descriptions of the Cream-coloured Courser, see Temminck, *Manuel d'Ornithologie*, vol. ii., p. 513 ; Weber, *Atlas des Oiseaux d'Europe*, *Liv.* 26, pl. 4 ; Selby, *Illustrations of British Ornithology*, Part ii., pl. 33, and vol. ii., p. 217 ; and Jenyns, *Manual of British Vertebrate Animals*, p. 176.

Two other species of *Cursorius* are, "to complete the monography of this little genus," enumerated, and briefly described, by Temminck. The first, *C. Asiaticus*,—*Courte-vite de Coromandel*,—inhabits Africa and India ; and is distinguished by the following specific characters : Vertex ruddy ; neck and breast chestnut-red ; nucha, wings, and tail, brown : higher parts of the abdomen black ; lower parts, rump, wing-coverts, and extremities of the tail-feathers, white. Beak black ; legs yellowish. Length eight inches. The last, *C. bicinctus*,—*Courte-vite à double collier*,—found in the interior of Africa, by Le Vaillant, is characterized by the existence, as the specific designation indicates, of a *double black collar* around the neck. It is ten inches long ; inhabits sterile lands at a distance from water ; and runs with amazing swiftness.

From the structure of the beak and foot, and the fleetness in running, exhibited by the three known species of Swiftfoot, and probably also from the sandy and sterile districts selected for their habitation, Temminck was led to regard them as nearly allied to the smaller exotic species of the Bustard genus. In accordance with these views, the *Cursorius* is made immediately to follow the *Otis* genus, in Temminck's valuable work, and in the first edition of Selby's *Illustrations*. On deliberate examination, however, the Swiftfoots have been found more closely to resemble, in their external characters, the Plovers than the Bustards : and *Cursorius* has consequently been arranged, by later ornithologists, and by Selby, in his second edition, as a genus belonging to the *Charadriadæ*, or Plover family. In general form and character at least, the subject of my present sketch exhibits a more striking resemblance to the *Himantopus melanopterus*, or Black-winged Stilt, than to any other bird with which I am acquainted.

STUDY OF NATURE.

No. I.

RECIPROCAL INFLUENCE OF THE NATURAL SCIENCES.

By ROBERT MUDIE.

THOUGH, in the professional part of Natural History, it is necessary, for the advancement of the science, that there should be a division of labour, something analogous to that which exists among the professors of the arts, whether inventive or handicraft; and though in the one, the other, and every department of each, this division of labour, whether more of the head or of the hand, is the only means by which truth in principle, and dexterity in practice, can be arrived at; yet, in that study and knowledge of the productions of Nature, which forms so essential and so valuable a part of general education, the mode of procedure should be very different. In this, the great danger, and it is great in proportion to the talent and zeal of the party, is, that some single department shall entice the mind away from that general attention to the whole, which is requisite not only to the pleasure and profit of a well-cultivated mind, in the business and enjoyment of life, and the furtherance of the general weal of society, but also to the proper understanding and successful pursuit of the one branch, although that branch is ultimately to be studied professionally. Thus, even he who is ultimately to be an artist in the investigation of Nature, must at first be a general student, in the same manner as he who wants to be successful in any pursuit of life must first be a general scholar, or receive a good education, in order to enable him to grapple with any difficulty that may arise.

It is true that there stand upon the record, among those who have shone the brightest in most departments of human knowledge, and in every branch of human pursuit, many who appear to have stormed the citadel of knowledge and the temple of art, without apparent previous education, and with the strength of their own minds alone. But granting—which not one of themselves would have granted—that such individuals possessed this innate or instinctive method of arriving at the high places of the intellectual world, others must not deceive themselves by such examples. This original genius, even were it as real as it is imaginary, is but as the one great prize in a lottery of ten thousand blanks; and thus, though many might expect it, only one could get it, and all the rest would be losers. But in truth there is no such original genius. Every step that any human being can take in knowledge, must be a step in reasoning; and if the foot is but once let fall anywhere else than on the firm ground of well-sifted and thoroughly-established experience, down he goes in the quagmire of error and absurdity; and the labour

which it costs him to regain his footing—if, indeed, he shall ever regain it at all—would, with proper heed to his steps, have carried him far onward upon his journey.

Besides, those “stars” of genius follow the law of all other stars, by being conspicuous only in the dark, and more conspicuous the more profound the obscurity is, and the more vacant the space athwart which they are seen. In the mighty darkness of those ages, during which the combined mischief of reckless war, and senseless superstition, had well-nigh banished science from the earth, a single scintillation, and that too of some false light—of some *ignis fatuus* of the polluted air—was sufficient to constitute a star of the first magnitude, after which the benighted children of men wondered and worshipped; and this they were prone to endow with “airs from heaven” or “blasts from hell,” upon as slender grounds as those which called forth their wonder and their worship. But as the dawn of true knowledge broke, and the sun of science neared the horizon, the stars in that part waxed dim and disappeared; and when this glorious morning to the human mind had so far advanced as to shew, as it were, to the great body of the people upon the earth the objects immediately around them, in their true colours, so that each man might observe with his own senses, and judge with his own understanding, those stars of the darkness of intellectual night vanished away, as is the case with their namesakes of the natural sky.

We do not say that the full light of the sun of knowledge has yet broken upon even the most lofty pinnacles of human nature; but we do say that the morning dawn is both broad and glorious; so that any one who has eyes to see, and will use them, may fully understand everything which comes within the range of his observation, and within the legitimate pale of human philosophy. And it is precisely because such is the case—because the light of science is general, and sets off the qualities and the nature of things by their coincidences and their contrasts, it has become so necessary thoroughly to understand the general nature of this light, before we proceed to the details of those subjects which it reveals to us.

The illustrations which we may draw from this analogy of the light of Nature, and of the light of Science, especially of the science of Nature, are very numerous, and they are equally apt and striking. It is the light itself which reveals to us the forms of things, and which paints them with all their varied colours. In the blackness of darkness, the most lovely flower, or the richest parterre, is a mere blank; and if we examine objects by means of a decomposed light, or through a tainted or coloured medium, the false colour of the light, or the taint of the medium, disguises all that we see; just as looking through a red glass makes the whole landscape red; or as the murky air, by turning aside all the more refrangible colours of the solar beam, makes the cloud, and even the sun itself, seem murky. Those matters were not understood until men knew how to divide the white light of the sun into its component shades. But when once this was

accomplished, the mine of knowledge therein contained was so far from being exhausted, that it was merely opened; and when chemical analysis came to be united with this optical, or mechanical, resolution of the sun-beam into its colours, it was soon found that there were principles there of which the colours, considered merely as such, had given no indication. The heat, found most intense without the red extremity of the spectrum, and fading away as the other extremity is approached, was one wonderful step in discovery; because it shewed that, besides the infinite variety of colouring influence in the solar beam, there is an infinite variety of another influence, following a different law, and not cognizable by our organs of sight. A further step was the power of oxidation at one extremity of the spectrum, and the power of deoxidation at the other, which are not discernible to the eye like the colours, neither are they palpable to the feeling, or to the thermometer, like the variations of heat.

This is not the ultimate boundary to which judicious analysis, proceeding cautiously by steps of experience, has already arrived on this most beautiful and truly wonderful subject; for there is a sort of glimmering forecast or belief that all those singular effects of the different extremities of the spectrum which are gradual from the one extremity to the other, are modifications of two antagonist powers, as it were, upon which every action of Nature depends, or rather in which every action of Nature consists. That there is a close connection, and, indeed, an absolute identity, with the action of heat, we need not say, for it is felt. On such subjects it requires great labour, and still greater care and skill, to arrive at any thing like even mental demonstration; but the probability is that there is a similar identity with those actions which we call electricity, and galvanism, and magnetism, which seem, in truth, to be nothing else than modifications of one general species of action; for when brought to a certain degree of intensity, which has been determined by experiment, their effects are the same; and identity of effect is the only means that we have of believing in identity of cause. Nor is this all; for what we call the principle of growth in vegetables, and the principle of life in animals, both of which are merely actions, not substances, and actions differently modified under different circumstances, we can still trace a striking similarity. Nay, we may almost venture upon one step farther, which would join the heavens and the earth together in one mighty problem, and furnish us with an instrument of universal knowledge, in so far as the material creation and its phenomena are concerned. Between those more stubborn energies of the solar beam, which resist most powerfully the refractive influence of the prism, and that gravitating influence which retains the planets in their orbits, there is a most singular, though, in the present state of knowledge, a most mysterious, resemblance,—they are both stubborn to the line which joins body and body. On the other hand, there is a corresponding resemblance between the more yielding or refractive energies, and that orbital force which balances the central one, and sustains the planet in its orbit. It is

true that we must speak with great caution of matters so refined as these are, and so little within the limits of our common observation ; but still so many of them are clearly established, and they point so naturally to the establishment of the others, that it is desirable to keep the spirit of inquiry awake, and ready to avail itself of every means of additional knowledge.

Some may ask, what all this has to do with the study of the Natural Sciences ? but such a question can be put only by those who have confined themselves to one department, and are, by necessary consequence, ignorant of the general bearings even of that department in its relations to, and its influence upon, the rest of nature. Let any one cast a glance of knowledge over the globe which we inhabit, and mark the various productions of its different hemispheres, its different latitudes, its different elevations, its different surfaces and soils, and its different alternations of land and of water ; and he will not fail to see that some principle which will meet all those differences is absolutely necessary, if his contemplation is to do anything else than to torment him with the sting of his own ignorance. Why grows the pine in such countless millions in the higher latitudes of the northern hemisphere ; while in those of the south there are no corresponding trees, except a few clusters of araucarias ? Why does the fern stand, in certain southern forests, as a tall and perennial ornament, while our plants of the same natural family die down to the earth every season ? Why does the palm rear its majestic stem and expand its graceful crown of leaves in every tropical country round the earth's girdle, and constitute there the most valuable tree, both for food and for shelter, to man ; while so high as the middle latitudes of the quadrants, not a single specimen, planted by Nature, is to be found ?

Such are one or two, out of countless thousands of questions, which stand at the very portal of the temple of Nature, loudly demanding each its answer before the student can profitably enter. We might extend them to every department of both kingdoms of active nature ; and as the members of these are composed of the same matter as that which we call the inactive kingdom, it also must be included. All this, too, is confined to the present moment ; but when once a man is imbued with a love of Nature, he cannot resist looking back at the record. Nor will he fail to ask himself such questions as the following : why are our tree fern, our elephant, our hippopotamus, and countless others, to be found only buried in the earth ; while other regions in the world have theirs still growing or alive on its surface ? We shall return to the subject.

OBSERVATIONS ON THE IMPORTANCE OF THE STUDY OF COMPARATIVE ANATOMY,

WITH A TRANSLATION OF BLUMENBACH'S CHAPTER ON THE STRUCTURE OF
THE BONES.

HUMAN Anatomy and Physiology constitute the great foundation of all medical science. A correct acquaintance with the structure and functions of the lower animals is not less essential to the physiologist and the student of Zoology than to the medical philosopher. No one can acquire a profound insight into the functions of the human organs, unless he have borrowed from Comparative Anatomy the clear and powerful light which that interesting science can alone supply. Structure, again, is the broad and solid basis upon which all consistent and philosophical arrangements of the animal kingdom must ultimately repose. Had the late Dr. Haighton, of London, wisely condescended to examine, previously to the promulgation of his views, the relative situation of the spleen in some of the inferior animals, we should never have been favoured with his specious but ephemeral theory of the physiology of that organ in the human body. If the great Linnæus had been as sound a comparative anatomist, as he has shewn himself an accurate observer of the exterior forms of natural objects, the lobster could never have preposterously figured, in his System, among apterous insects. Nor by any zoologist, even slightly cognizant of the anatomy and physiological peculiarities of the *Cetacea*, or Whale tribe, could these singularly constructed animals have been placed, or retained, as by the superficial Pennant, in the class of Fishes.

The study of the animal kingdom, although not so obviously and directly useful, is almost as interesting to the man of business, and the student of the different sciences, as to the medical practitioner. To all, it offers an occupation for the hour of leisure or retirement, not less salutary than delightful. The individual, upon whose habits of order, precision of thought, and accuracy of discrimination, success or failure in the paths of commerce or agriculture must mainly depend, will be gratefully surprized at the increased facilities and power which he cannot fail to acquire, in the performance of these intellectual operations, from the habit of observing, and arranging in his mind, the varied facts and phenomena which the field of animated nature is incessantly presenting to his view. And the agriculturist, by an acquaintance with the principles of Comparative Anatomy and Physiology, will be best enabled to comprehend the nature and treatment of the diseases of those domestic animals in the well-being of which he is so deeply interested; as, by an insight into the economy and transformations of the insect tribes, he can alone be prepared to effectually remedy, or avert, their frequently ruinous depredations on the produce of his fields.

To the man of loftier intellect or aspirations, who has fortunately learned to gaze upon creation with the eye of the naturalist and philosopher, rather than of the poet, an examination of the structure and economy of the animal kingdom will disclose elevating and comprehensive views, and supply facts and illustrations; which, whatever be the path of science or literature he is destined to tread, may incessantly be turned to admirable account in his peculiar calling: and, as Cuvier has beautifully observed, the peaceful pursuits of Zoology will serve to tranquillize and sustain the agitated and the weary spirit amidst all the anxieties and disappointments, the petty jealousies and detractions, with which those paths are so sadly and so painfully infested.

The application of the study of Zoology, as of Natural History in general, to the science of Medicine, is not less evident in other respects, than in its more immediate connections with the Anatomy and Physiology of the human body. From the animal and vegetable, the mineral and gaseous kingdoms, the physician and surgeon derive all the boasted resources of their beneficent art: and ought not the workman to cultivate a familiarity the most intimate with the structure and composition, the properties and arrangement, of those instruments which he is incessantly called upon to employ? In the character and tendency of studies like these, as in the intellectual discipline which they necessarily impose, there are, also, an especial fitness, and an influence, calculated most powerfully to recommend them to the notice of medical men. For he, whose organs of observation have been sedulously trained to the accurate discrimination of the minuter differences whereby the various species of animal, plant, or mineral, are respectively characterized, will, doubtless, in general, more readily and distinctly appreciate, than the man of untutored eye, the slighter diversities, the more delicate and evanescent forms and phenomena, exhibited by disease. It may even be questioned whether science and humanity have not been principally indebted to the habits of close and patient observation acquired by Dr. Jenner, in his pursuits as a naturalist, for the splendid discovery which has immortalized his own name, and thrown an additional and enduring lustre around the scientific reputation of his country.

The mind of the medical practitioner, moreover, if, in the hour of retirement from the active duties of his profession, it be not occupied by these elevating and congenial subjects, will too frequently contract habits, or fly for recreation to amusements deeply injurious or destructive to that calm, contemplative, and philosophic spirit, which he will best consult his interests and reputation by cultivating or acquiring; and utterly inconsistent with the comprehensive attainments and intelligence, the purity and decorum, the lofty elevation of character and of feeling, by which the votary of medical science should invariably be distinguished.

Deeply impressed with a conviction of the utility of these studies, and the beneficent influence which they are calculated to exert upon the public mind, we have

lost no opportunity which presented itself, of inciting those around us, and more especially the younger members of the medical profession, to the prosecution of a path of inquiry from which we have, ourselves, derived such pure and delightful recreation,—so many and such solid advantages. In this spirit, we, nine years ago, contemplated a translation, from the German, of the last edition of Blumenbach's celebrated *Manual of Comparative Anatomy*. Subsequently to 1807, when Mr. Lawrence's masterly translation of that work was first published, Zootomy had made a rapid stride in this country, and, more particularly, on the continent; and one or two other editions of Blumenbach's *Manual* had seen the light. On receiving information, however, from Mr. Coulson, that he was actually engaged upon the work, we, without hesitation, abandoned the project. His translation, or rather revised edition of Mr. Lawrence's translation, soon afterwards appeared; but we candidly avow that the work, in its style of execution, falls very far short of the expectations which, from our knowledge of the talents, industry, and attainments of Mr. Coulson, we had been led to indulge. Several inaccuracies which had escaped the vigilant eye of Mr. Lawrence, have been suffered to pass without correction. Various errors, of which that distinguished writer never could have been guilty, disfigure the interpolations of Mr. Coulson; and divers passages, introduced by the German Professor into the last edition, have been doomed to inexplicable neglect. Still worse, the notes of Blumenbach and Lawrence have been frequently incorporated, by the sub-translator, with the original text: and the bulk of the volume has been needlessly swelled by the introduction of matter frequently uninteresting, and sometimes destitute of any very obvious connection with the subject. Under these circumstances, we may, perchance, render an acceptable service to the readers of *The Naturalist*, by presenting a close and nearly literal translation, without regard to elegancies of style, of certain portions of the pure text of the last edition of Blumenbach's *Manual*; and concisely adding, in notes, such new facts and illustrations as our own reading and observation may enable us to supply. For the benefit of the student of German, we shall add, in parentheses, the German synonyms of such of the various scientific and especially anatomical terms, as cannot be found in the ordinary dictionaries of the language. The French and Latin synonyms, when new or peculiar, will also be introduced.

The *Manual* of Blumenbach, it will be seen, is destined merely to communicate elementary knowledge: and, on this account, we have selected it as far better adapted for the purpose of conveying popular instruction, than the more elaborate, profound, and comprehensive productions of the later German and the French zootomists. A very correct general acquaintance with the anatomy of animals may, however, be acquired from an attentive and re-iterated perusal of Blumenbach's work; especially if the student be careful to impress upon his memory the leading facts of the German writer, and to verify his descriptions by frequent examination of, and their comparison with, such specimens of the animal structure

as may fall within his reach. They, who thirst for knowledge from a deeper source of zootomical science than the *Manual* of Blumenbach supplies, will find, in the writings of Cuvier, Blainville, and Geoffroy-St.-Hilaire, among the French—, of Meckel and Carus, among the German—, and Macartney, Lawrence, Grant, and Todd,* among British zoologists, ample stores wherewith to gratify their longing.

In this number, we shall merely present, as a specimen of our proposed labour, a transcript of the first short chapter of Blumenbach's work. The continuation, or abandonment, of the project will entirely depend upon its reception by the public. If deemed useful and instructive, it will be steadily prosecuted to the end. Yet an adverse opinion, however it may cause a slight deviation, will not ultimately deter us from our fixed purpose; which is that of exhibiting, in a series of contributions to *The Naturalist*, an outline, traced with all the clearness and precision which we can employ, of the anatomy, physiology, and principles of arrangement, of the Animal Kingdom.

MANUAL OF COMPARATIVE ANATOMY.

FIRST CHAPTER.

OF THE STRUCTURE OF THE BONES OF ANIMALS, IN GENERAL.

§ 1. NONE but red-blooded animals (die rothblütigen Thiere) possess a true skeleton;† in which their bones are, with few exceptions,‡ united; and on which the general figure, and the degree of flexibility, of their body principally depend.

§ 2. The ordinary white colour¶ of the bones exhibits several shades or gra-

* We particularly recommend to the notice of the student the excellent *Cyclopædia of Anatomy and Physiology*, now in progress of publication, by Mr. Todd.

† Only in a few insects and worms (*Crustacea* and *Zoophytes*), are parts of a really osseous structure developed: as the bones in the stomach of the lobster, and other species of the *Cancer* (or *Astacus*) genus; and the bony apparatus in the mouth of the Sea-urchin, *Echinus* (See-Igel). These parts, at least, more closely resemble, in structure, true bone than the peculiar substance, *Os Sepiæ*, obtained from the Cuttle-fish, *Sepia officinalis*.

‡ These exceptions principally are the os hyoides, or bone of the tongue (zungenbein), the patella, and sesamoid bones, in many of the *Mammifera*, as in man; the bone of the *membrum virile*, in divers other of the same class, as the dog; the clavicular bones (*ossa clavicularia*) of certain *Mammalia*, as many of the *Feræ*, and some *Gliræ*, in which these bones exist, merely connected with the muscles; and the whole thoracic extremity in those animals which, as the *Solidungula*, possess no clavicle; the bony ring in the sclerotica of the bird's eye; and the intermuscular bones (*Fleischgräten*,—*ossicula musculorum*) of fishes; and their ventral fins, which correspond to the pelvic extremities of the higher animals.

¶ It is remarkable that the well-known experiment of imparting a red colour to the bones of an animal, by the admixture of madder with its food, succeeds very imperfectly in cold-blooded animals (*kaltblütige Thiere*).

dations, sometimes even in the same piece; as, for instance, in the grinding-teeth (backenzähnen) of the Elephant: and in some few genera, or races, of animals, they are invariably of another colour. Thus, the bones of the Gar-pike (der Hornfisch,—*Esox belone*,—*Belone vulgaris*, of modern ichthyologists,—la Bélone, Fr.) are green; and the bones of many varieties of the common fowl are of a blackish colour.

§ 3. Still more variable is their texture and grain, as well in different bones of the same skeleton, as in those of particular classes and orders of animals. Thus, the fragile constitution of the air-bones (Luftknochen) of birds; their fibrous structure in many of the larger *Amphibia* (Amphibien) and fishes; and their peculiar toughness and density in some parts of many cartilaginous fishes, (Knorpelfische) conspicuously distinguish them from other bones.

§ 4. The crown, or exposed portion, of the teeth excepted, the bones are universally invested, on the exterior, with periosteum (Beinhaut); and, for the most part, are provided internally with marrow;* which, differing greatly in consistence, is, in the *Cetacea* (Cetaceen), a fluid oil (ein flüssiger thran).

§ 5. The teeth again, for the most part, excepted, the bones are formed by the ossification of original cartilages. This process of ossification appears, *ceteris paribus*, to commence earlier, and go on more rapidly, in viviparous (lebendig gebährende) than in oviparous animals (Eyerlegende Thiere). This fact, at least, results from comparison of the incubated chick with the fœtus of *Mammifera* (ungebohrne Säugethiere). Among the latter, again, many points of ossification are sooner completed in quadrupeds than in man. P.

NOTES ON BRITISH INSECTS.

By JAMES CHARLES DALE, M.A., F.L.S., &c., &c.

COLEOPTERA.—*Cicindela sylvatica* is found in great plenty on Parley Heath, in the New Forest, &c., in hot, dry, sandy paths or heaths, as early as May 9th, and appears in constant succession till October 9th, according to my journal. *Cicindela maritima* I have never taken, but have seen alive at Bourne Mouth, Hants, on hot, sandy places, near the sea, from the middle (?) of May; and according to the MSS. of the late Captain Blomer, he found it in profusion near the mouth of the river Ogmore, in South Wales, in June, 1832, and sent me several,

* Principal exceptions: The horns of the Stag, the long bones of the Seal, the *Cetacea*, and the Turtle, which exhibit no medullary cavity; and the air-bones of birds.

amongst which one appeared very nearly allied to, if not identical with, *C. hybrida*. *Cicindela Germanica* I have found at Black-Gang-Chine, in the Isle of Wight, and in great profusion near Charmouth, and Seaton, where I also found the larva. It appears from the middle of June to the middle of September, and differs from the other *Cicindelæ* in seldom taking wing, and delighting in wet places, among reeds, amidst which it runs very fast. It appears to be mostly confined to the coast, but has been found sparingly near Reading and Dartford. *Carabus purpurascens* has been discovered near Weymouth, by Mr. Saunders, about 1833. *Carabus intricatus*: one of these fine insects was caught in Mamhead Park, near Dawlish, a few years ago, and two specimens were taken amongst alders, at Shobroke, near Exeter, and are in the cabinet of a person at Taunton. *Cistela curvipes* was found on Lodmoor, near Weymouth, by Mr. Saunders. *Platypus cylindricus*, I took a few of, in the New Forest, on the 3rd of August last. *Cryptocephalus bilineatus*, in plenty near Langport and Carisbroke Castle. *Anisophia ruficollis* has been found abundant in the Devil's Ditch, and Triplo Heath? and Gog Magog Hills, where I took one, June 26, 1833. It seems nearly confined to that part of the kingdom, one only having been found near Reading till, I believe, last July 6th, when I was surprized by taking one near Lulworth, when I was in company with Frederick F. Morris, Esq.

LEPIDOPTERA.—In the British Museum is a curious larva, black, with white belts, and a spine on the tail, found on the pine, in Scotland, by Dr. Leach. The year 1834 seems to have been very favourable for the appearance of the *sphinxidæ*. Three specimens of *Deilephila Livornica* were taken near Peterborough, July 5, 1834, one of which (all ♂'s) laid eggs which were hatched and nearly full fed; besides a larva taken by a boy near that place and killed, another was taken, about the same time, near Worcester. One was found, April the 19th, 1829, at Wakering, Essex; and other captures, within a few years, refute the idea of its not being British. A very perfect specimen (though faded, from having been hung up many years in a glass case, on a wall) is in the cabinet of the Rev. F. O. Morris.—*Celerio*: I have a very fine one, found at Brighton; others have been found at Newcastle, Ramsgate, Worcester, Peterborough, near London, &c.—*Achemon*, of Drury: Mr. Stothard had one which, he said, he took in his garden, in Newman-street, Oxford-street, many years ago.—*Euphorbiæ*: there are two unset in the Linnean Cabinet, with a ticket—"Devon, Dr. Wavell, 1818."—*Galii* has been found at Bridgewater, Langport, Charmouth, Yarmouth, &c., all within these last two or three years: August and September seem to be the season for it.—*Atropos*: August 15, 1825, Captain Blomer found a larva, very dark, and similar (?) to Fuesly's figure, near Bideford; but the moth did not vary when bred.—*Populi*: I took a large pale variety of, July 30, 1808, and Captain Blomer bred another similar one, July 30, 1825. Those found in June are smaller, and darker in colour.

NOCTUA.—*Haworthi*, Curtis. There is a specimen in the Linnean Cabinet, marked "Angl., D. Jones, unknown."—*Præcox*, in Linnean Cabinet, marked "Portland Island, Allen."—*Citrina*? in Linnean Cabinet, marked "*Noctua mucronea*, B. Clark: Suff., Kirby, 1797; rariss."—*Siona dealbata*, near Langport, June, 1835; Mr. Quekett.—*Arcturus*: Mr. Westwood says that Mr. Curtis's genus *Arcturus* must be *rejected*, having been previously used by Latreille, to distinguish a genus of *Crustacea*. (Perhaps *Latreille's* genus *Arcturus* may fall also, being used in *Astronomy*; and Stephens's *Janus* has been used by Kirby and Spence). But what will be gained by its being changed? Can a *Moth* ever be confounded with a *Crab*? The name *Colias*, a genus of *Butterflies*, was previously used for a genus of *Fishes*, I believe, and yet it is continued by *all*; and perhaps neither may stand eventually, by the perpetual changing of systems. *Agabus* is used for a genus of Water Beetles, but its proper signification is a *Locust*!!

Again; Mr. Curtis is said to have placed *Acentria* at col. 137 of his *Guide*, at the end of *Trichoptera*. Mr. Curtis not being *sure* that *Acentropus* was identical, of course gave another name, similar however, and, in the *Guide*, places it just before *Lepidoptera*, one of which Mr. Westwood considers it. Mr. Curtis's arguments have more weight with ME that it is *Trichopterous*; and they BOTH agree that Stephens is wrong in putting it in the *Neuroptera*.

Moses Harris, in his *Vade Mecum*, mentions his having seen an *Egeria* on a flower, in Norwood. *Egeria ichneumoniformis* I found an hermaphrodite specimen of, near Lulworth, on the 6th of July last; August 5th and 11th, I found several at Carisbroke Castle, varying much in size. The small variety is figured by Mr. Wood as a new species, and named *Muscæformis*. Mr. Rudd took a very large and magnificent specimen on the 11th, which shews it was not too late, although several were much faded; I also took one near Niton, on the 8th. The late Captain Blomer observed that they vary in size, and he found them in plenty near Teignmouth, settled on rocks from June 29 to the end of July. Some I observed were fond of the *Ononis*: they seemed partial to the neighbourhood of the sea. *Egeria vespiformis*, (Curtis), I took in plenty, the end of May and beginning of June, in Clapham Park Woods, Bedfordshire: the first I saw was on a leaf of burdock; but I afterwards found the larvæ and pupæ under the bark of the stumps of oaks, and found them in every stage at the same time. Mr. Rudd took one in the New Forest the end of May, 1834; and I saw one the beginning of August, 1835, hovering over an oak stump there, but lost it; a cloud passing over the sun at the same time. *Hypogymna dispar*, found on the Turf Moor, near Shapwick, Somerset. In the Linnean Cabinet I observed a Moth allied to the genus *Spilosoma*, or *Arctia*. Whitish, or speckled slightly with black, and rather transparent, from Mr. Hudson; but it is not noticed as British in any book I have seen: the antennæ are too much pectinated for it to belong to

Spilosoma. Mr. Bentley bought the specimen of *denudatus** of *The Entomological Transactions*, at the sale of the late Mr. Haworth. *Penthropha nigricans*, I had found previously two larvæ enclosed in cases, which I suspected to belong to this species, and I found one, August, 1835, on Parley Heath, which, not having bred the spring following, I cut open, and found it had changed to a *pupa*, but had died; which I attribute to the shaking it got on my returning home, on horseback, a distance of nearly thirty miles. I hope to ascertain more, against another time, about this curious insect. *Lobophora polycommata*, one taken near Sparkford Inn, Somerset, end of February, 1832. In the Linnean Cabinet there is a very large specimen of *Papilio Podalirius*,† I believe, from North America. Dr. Abbot mentions, in his MSS., having taken *Pontia Raphani* near Bedford, August 6, 1799. I bought his collection, but I cannot make out which specimen he means by it, as there is a variety of *Napi* and one of *Callidice* with the name of *glacialis* on it. In the Linnean Cabinet I observed a *Hipparchia*, with a ticket, on which is "Angl., Hudson, rariss.:" mixed with three or four more under the name *Arcanius*; but the one with the ticket has certainly nothing to do with *Arcanius*, and is either a variety of *Davus* or *Polydama*, and probably from the neighbourhood of Bala Lake, or Pemble Meer. The ♀ of *Lycæna argiolus* taken in the spring, have a narrow black tip to the superior wings; that in the autumn, very broad. *Hesperia comma*, taken as early as July 22nd, 1835, on the Blandford race course.

DIPTERA.—*Cecidomya pictipennis* I have found as early as February 10th, in 1832, on moss, and roots, &c., of Whitethorn. *Anisomera*? *nigra*, a species with very long antennæ (especially the ♂) found at Kenfig Pool, South Wales, by the late Captain Blomer, 1832. *Leptomorphus Walkeri*, found dead in a window, at Blandford. *Messala Saundersii* I took at Glanville Wootton, this spring. *Oxycera Leonina*: the Rev. F. O. Morris gave me a ♀, and July 9th last I took a ♂ at Charmouth. *Oxycera Morrisii*, I took one of, at Backsbite, near Cambridge, June, 1833; which is the only locality I know of, besides the neighbourhood of Charmouth. *Medeterus conspersus*, on a boggy part of Lewel Heath, near Dorchester, 1835. *Æstrus pictus*: on the 31st of last July, in passing through some high fern near Rufus's stone, in the New Forest, two insects settled before me on the fern, which I missed taking, owing to the stems of the fern meeting the net. I thought, at the time, they were the *Æstrus pictus*. The next day, however, one came and settled before me on some dry leaves, near Lyndhurst, which I captured. It varies a little from Mr. Curtis's figure, having the centre of the thorax tawny. Mr. Samouelle's specimen (figured by Curtis) was taken in June.

* Mr. Raddon has a foreign specimen of *denudatus*.

† Mr. Curtis has figured *Podalirius* on plate 578 of his *British Entomology*.

HYMENOPTERA.—*Cephus satyrus*, *pusillus*, and *tabidus*, abundant at Glanville Wootton, in 1835. *Evania minuta* in plenty at Black-Gang-Chine, Isle of Wight; also, Parley Heath, and near Mount Misery, 1835. *E. fulvipes*, one near Christchurch Head, August, 1835. *Eumenes atricornis*, I have seen small round earthen pods on the heath, but never knew what they were till this year, when I bred this species, on July 6th. I have taken it as early as May 26th, and as late as the end of August, on Parley Heath, New Forest, and Ramsdown; and Captain Blomer found one or two in Wales. *Nomada*: I see by Captain Blomer's journal that he bred one! *Sparazion frontale* was found rather plentifully by Mr. Rudd and myself at Black-Gang-Chine and Parley Heath, last August, but not in the New Forest, I believe. *Scelio rugolosus* is in profusion at Lulworth. I have taken it at Glanville's Wootton, and other places, not uncommonly.

HEMIPTERA.—*Pentatoma pusilla*: I took four specimens in an inclosure in the New Forest, June 27, 1832. *Cydnus dubius* taken on the Gog Magog Hills, in April, at Portland ferry, by Mr. Streatfield; and I took a pair on Hodd Hill, August 19th, 1835.

There has been some difference of opinion as to whether *Lycæna Agestis*, *Salmacis*, and *Artaxerxes*, form three, two, or only one species; I am in favour of the last, and consider the difference to arise merely from the influence of locality, or geographical distribution. The *Artaxerxes*, I believe, is not found south of the Tweed, excepting only one found in Devon, according to Dr. Leach's MSS. But I have observed a few having a slight black pupil to the ocelli, on the reverse side; and one I took at Duddingston Loch has it more distinct than some of those taken at Newcastle, where it assumes the name of *Salmacis*; some resembling the former, and some differing but little from our southern species (*Agestis*) or variety, and which has been supposed by some persons to be hybrids. From those who contend for three species, I would request opinions as to a specimen lately taken, near Langport, by Edward Paul, Esq., being evidently *Agestis* (a remarkably fine ♂) with a more complete white spot, with a black pupil, than any I have seen from Newcastle; and I have a specimen or two shewing a little white cincture to the black spot. Surely it would be going too far to make a fourth species; and yet it is better than *Salmacis*. I think this proves, beyond doubt, that they are but one species; and I think this Langport variety an interesting capture. Mr. Bentley has a beautiful variety of *Agestis*, totally destitute of black ocelli on reverse. The larvæ of Butterflies are not very often met with, and I should have thought the time to seek for them would be in the sunshine; but by the MSS. of the late Captain Blomer, I find he collected several by the use of a lanthorn, such as *Hipparchia Galathea*, *Janira*, &c.: and I find, also, he bred from larva a specimen of *Lycæna Alsus*, our smallest British Butterfly; and from his journal I should imagine him to have been a most indefatigable collector.

NOTES OF A BOTANIST.

TO THE EDITORS OF "THE NATURALIST."

THE perusal of your prospectus has imparted to me, and I doubt not to many, a pleasurable satisfaction. That individual must, surely, be wilfully blind to what passes around him, who cannot recognize in very much of the boasted science of our times, an unhappy admixture of the leaven of scepticism; and sentiments are unblushingly promulgated, which, if extended to their extreme limits, would plunge us headlong into the vortex of unredeeming atheism. With some, indeed, it seems a matter of course to introduce into their communications, however irrelevant, a sneer at revelation, by way of episode. Such cowardly and uncourteous conduct, so far from recommending science and increasing the number of her votaries, makes her features repulsive, and her lineaments unamiable. It is a flagrant breach of the rights and privileges of the commonweal, to convert science into a subtle medium for sapping the foundation of all religion, whether natural or revealed; because the opinions thus infused happen to be the private sentiments of the individual whose name they bear, but who may be a stranger to the multifarious arguments by which opposite conclusions may be supported and confirmed. Far be it from me to fetter or to curb the reins of thought: nay, rather let thought expatiate boundlessly and range fearlessly among her magic creations. I would only stay her flight to forbidden regions, and confine her excursions to their legitimate province.

The spontaneous origination of matter, innate vitality of atoms, convertibility of plants into animals, and its reverse, with all their numerous offsets and ramifications, are among the hideous scars which mar the beauty of Natural History, in many of the writings of modern times. Vague and unmeaning hypotheses, remarkable only for their reckless folly, cradled among the atheistical notions of continental philosophy, form a chaos of absurdity in which not a few, I fear, of our pseudo-philosophers are now floundering purblind; and unmitigated by a solitary ray of genuine truth, inculcate sentiments and opinions as hostile to inductive science, as they are to common sense and sober reason.

The only maxims that will guide us surely and lead us safely, are those that own a BACON for their counsellor, and a NEWTON for their engineer. Under their guidance and direction, the progress of knowledge will be solid and sterling, and her triumphs lasting and brilliant. The path of wisdom will then, indeed, be illuminated by a light from heaven. These are the tests and touchstone of genuine truth, and the only standard of legitimate appeal; and, while one says, "I am of Lamarck," and another, "I of Latreille or St. Hillaire," be it *mine*,

with Bacon, to admit nothing that bears not the stamp of trfal and the signet of inductive scrutiny; be it *mine* to accept no theory as valid, that is not the offspring of accumulated facts, collected from the roll and register of multiplied and diversified experiments; be it *mine* never to torture or to twist, lengthen or shorten, with the inquisition of a Procrustes, however ingenious may be the device and cunning, facts and experiments to suit preconceived whims and fancies; be it *mine*, also, with Newton, to trace the phenomena of the universe of being, up to their divine origin and sublime and awful source.

I cannot, therefore, but rejoice, that, in your prospectus, you have avowed yourselves as determined never to forget the dependence of the whole on the one Divine Originator. I am sure numbers will join with me, in wishing every success to a periodical that comes to us so highly recommended; and I am quite certain there can be no sound philosophy that does not recognize an intelligent first cause, and a prospective and legislative Providence.

By way of apology for these preliminaries, I beg to communicate, *ad interim*, a few miscellanea, as an earnest of something more elaborate for an early number.

I.—NATURAL VENTILATION OF SEEDS.

This occurs to me as one among many questions of curious interest in the physiology of plants; though I believe it has been entirely overlooked. The seed-vessel of the Heart's-ease is pendent and reversed; the seeds are ultimately naked and exposed till the period for their dispersion arrives, when the seed-vessel becomes erect, and adjusts its open valves to imbibe the direct rays of the sun-beam. In the former case, it is evident that rain could not injure the immature seeds, nor moisture lodge within the cavities. In some plants we find the reverse of all this, the exception being provided for their peculiar contingencies. The Butter-nut, is supplied with an open slit, or natural vent, for the specific purpose of ventilation; and there is, also, for the same reason, a circular orifice at the apex of the shell that encloses the triangular Brazilian Nuts—a shell possessed of adamantine hardness. By this opening atmospheric air, as in the former case, gains admission. In the capsules of the Poppy, the ventilating orifices are beneath the canopy which crowns them. On both sides of the *Hura crepitans*, or Monkey's Dinner-bell, there are narrow meshes, or windows, by which the air circulates, matures the seeds, and promptly dries up whatever moisture may find an occasional lodgement within the shell; it would, otherwise, explode long before the period of maturity supervenes. In the *Hernandia sonora*, or Whistling Jack-in-a-Box, the air winds among the avenues of the seeds, there being a round aperture on the summit of the capsule, and the seeds occupying only a limited portion of the inner chamber: the tree thus becomes

vocal; and the tropical traveller, often surprized by these unearthly sounds of the forest, starts affrighted. The Wild Carrot contracts and inflects its umbels during rain, and unfurls them in dry weather: the air then sifts and filters through the interstices, thus ventilating the seeds that might otherwise decay from excess of moisture. The spiral valves of the *Didymacarpus rexi* are sensible hygrosopes; they untwist in dry weather, and expose the seeds attached to the axis, to the genial and ripening influence of the atmosphere. In moist weather, the valves will be found screwed closely together, completely impervious to air and moisture. Similar phenomena are very numerous, and examples might be indefinitely multiplied; but these are sufficient to illustrate my position.

II.—DIETETICS AND THERAPEUTICS, AS APPLIED TO VEGETATION.

That roots are selecting, discriminating, and appropriating organs, there can be no reasonable doubt; nor can it be expected that all plants should subsist on the same kind of food. As plants are infinitely diversified in their appearance, condition, and the local circumstances under which they are found, with the phenomena presented in their secretions and excretions, it follows that a diversity of diet is necessary. Various earths, and diversified materials from animal and vegetable sources, afford the nutriment we commonly apply; but oftentimes no rule of discrimination is adopted, for the same unvarying routine is incessantly repeated. Some peculiar kinds of plants are so much out of the ordinary way, in their port and manner, that they must, *prima facie*, enforce the importance of discrimination being necessary. The *Drosera rotundifolia*, and even the *Pinguicula*—the *Dionæa muscipula* and *Sarracenias*—are all clearly more indebted to animal matter for their supplies than other sources, and hence are duly supplied with bristles, pouches, and traps, to entangle and to catch insects; the decomposed animal matter being necessary to their well-being.

In the year 1818, I discovered that the bulbs of Hyacinths, the Narcissus, Persian Iris, &c., grown in root-glasses, excreted carbonic acid gas, &c., by their fibres. Macaire has since verified the fact; though I remember that, when I communicated the circumstance to Mr. Edward Rudge, he expressed much scepticism regarding the fact. This has, however, lately attracted considerable notice, and is likely to command still greater attention. Gum anime is found in cakes, among the roots of the *Hymenæa courbaril*; and it is notorious that the *Sal-sola kali* impregnates the soil, where it grows, with alkaline matter. The roots of many plants are very tenacious of life, and intense temperatures do not destroy their vitality; the roots of the *Vitex Agnus castus* will not be affected, though immersed in boiling water; and boiling water may, in many instances, be applied to the roots of plants, without injury. Again, if a mass of roots be divided into two parcels, acetate of lead, in solution, being absorbed on one side,

may be evolved again, by the second parcel, on the other side. Certain plants may absorb some 'poisons' by their roots, with impunity, which would be destructive to others. Other phenomena illustrate and confirm these truths, and it would be altogether superfluous to detail them.

But irrespective of the facts connected with the excretions of the roots which have been assumed as explanatory of the necessity of the rotation of crops, there is another interesting question involved in the curious inquiry, to which I am desirous to call attention, and which, as far as I know, has never been once suspected. It is this : how far particular plants may, or may not, prove injurious by their proximity to others, from exudations and exhalations of a more or less volatile kind, as well as gaseous products arising from stems, foliage, and flowers ; and therefore to what extent plants reciprocally affect each other. Certain plants grow freely side by side, or in juxta-position ; whilst the very reverse is the fact with others. Certain shrubs luxuriate beneath the shade of trees, and the copious showers that trickle from their branches ; while myriads would be destroyed under similar circumstances. Many plants perish near others, or disappear without any visible cause. Though the corrosive liquid that distils from the branches of the Manchineel is of too palpable a character to be questioned, there are others that seem more dubious. The blighting influence of the Barberry on certain crops, however, appears not to be apocryphal. The hardiest weed will not dare to shew itself beside that gigantic reed, the Bamboo ; and bees fall down dead suddenly, should they perchance alight on the branches of the *Rhus vernix*.

J. MURRAY, F.L. & G.S.

(To be continued.)

AN ACCOUNT OF THE STRUCTURE OF THE HEART IN THE TESTUDO MYDAS, OR GREEN TURTLE.

THE heart, in the several families of the Tortoises and Turtles, presents curious peculiarities adapted to the mode of life of the animals in whom these anomalies of anatomical disposition are met with. Each species varies a little in the anatomical structure of the central organ of the circulation ; but I shall, in this paper, take the *Testudo mydas* as the type of all animals of this order. The *Testudo mydas*, or Green Turtle,—the Tortue franche, of Cuvier, called by the Germans, die Grüne Schildkrote,—is found on all, or most of, the coasts of the torrid zone, feeding upon the weed at the bottom of the ocean, approaching the

mouths of great rivers for the purposes of respiration, and landing on the sand, during the night, to deposit its ova. The individual from which the present description is taken, weighed about 175lbs., the heart, when removed from the body, and emptied of its blood, was about the size of a large lamb's heart, and pulsated for six hours after death; the contractions of the heart, after they had apparently ceased, might easily be excited again by pricking it with the point of a needle. This excitability continued during three or four hours more.

The heart of this order of reptiles is composed of four cavities, like those of the mammalia and birds; two of the cavities receiving the blood from the body and lungs, the other two propelling it forward into the lungs, and to the system generally. Man and the higher orders of animals, as mammals and birds, have a perfect double circulation, the heart consisting of four distinct and separate cavities; two, the receiving parts, termed auricles, the propelling ones, called ventricles. The reptilia (of which the Turtles and Tortoises form the first order) have a circulation performed by an organ of a different anatomical construction: in these animals the cavities are still four-fold, but the cavities of the ventricles are not distinct from each other; they have communications through which the blood returning from the body generally, and that received from the lungs, are intermixed, and consequently an imperfectly decarbonized fluid is sent to the economy at large. The heart of the *Testudo mydas*, of which a general view is given in Fig. 1, is composed of two auricles and two ventricles, *a b* and *c d*, like

Fig. 1.

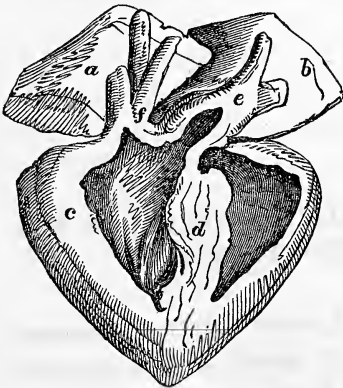


Fig. 2.

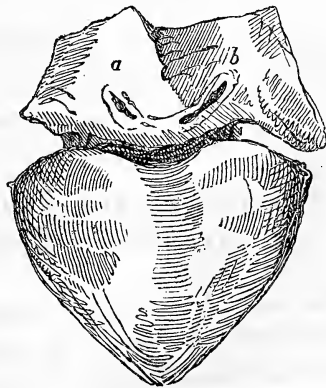


Fig. 1.—A front view of the heart, with the cavities of the right and left ventricles laid open. *a*. The right auricle. *b*. The left auricle. *c*. The right ventricle. *d*. The left ventricle. *e*. The pulmonary arteries. *f*. The aortæ, three in number; one destined to supply the head, neck, and fore limbs, the remaining two uniting to supply the posterior half of the body.

Fig. 2.—A back view of the heart, with the fissures, which mark the opening of the veins, returning the blood from the body and the lungs. *a*. The opening of the veins of the lungs into the left auricle. *b*. The opening of the venæ cavæ returning the blood from the body to the right auricle.

that of the mammalia and birds ; the blood returning from the body, having circulated through it, is received first by the right auricle (*a*), and propelled from it into the right ventricle (*c*) ; but instead of being thrown from this cavity into the lungs completely, as it is in the circulation of all warm-blooded animals, we find that a portion only is distributed to these organs. The chief peculiarity in the heart is met with in this cavity, for from it all the blood-vessels of both lungs and body arise. From the extreme right of the cavity is sent off the aorta, or rather the aortæ, for the vessel immediately divides into three, the centre one of which is distributed to the upper or fore limbs, head, and neck, whilst the two outer ones unite into one to supply the lower, or posterior, half of the body with blood. The blood sent to the lungs is received back into the left ventricle (*d*), and thence passed, through an opening between these two cavities, into the right ventricle. The course of the circulation is explained by the diagram, *Fig. 4*.

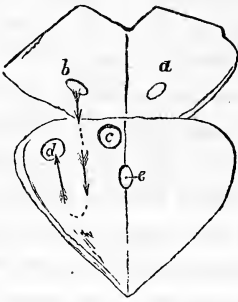
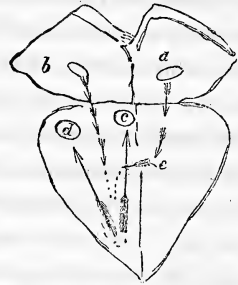
Fig. 3.*Fig. 4.*

Fig. 3.—A diagram, representing the course of the blood when the animal is under water. The blood entering through the veins into the right auricle at *b*, passes directly into the corresponding ventricle, and is propelled through the aorta (*d*) ; thus following a single course, returning from the body, and immediately re-sent to it without passing through the lungs.

Fig. 4.—A diagram, representing the double or mixed circulation, when the animal respire atmospheric air. The blood returning from the lungs, through the pulmonary veins (*a*), into the left auricle, passes through its corresponding ventricle, and thence into the right ventricle, through the opening in the septum, which divides them (*e*). The two currents of blood are here mixed, and re-propelled in this form, part to the lungs, through the pulmonary artery (*c*), and the remainder through the aortæ (*d*).

The blood returned to the left ventricle, from the lungs, is passed through, or thrown from, the left ventricle into the right, and hence, at once, by a double passage through the pulmonary artery (*e*) and the aortæ (*f*), to the lungs and system generally. In the Crocodiles, and some species of Lizards, there is but one ventricle ; and here the blood returning from the body and lungs is mixed in the same way. In the various species of Frogs and Serpents, the heart is reduced to two cavities, a single auricle and ventricle ; and hence the blood which has been fitted for circulation by the action of the air upon it in its passage

through the lungs, is still more completely mingled with that which has not been submitted to this action, and which is just returned from the body to the heart.

The mode of life of the reptilia, most of whom are amphibious, renders this peculiarity in the structure of the heart necessary. The corporeal, or greater, circulation is, in these animals, in some measure independent of the lesser or pulmonary one; for, in warm-blooded animals, no blood can pass into the left ventricle, and thence to the body, which has not previously passed through the lungs; the aorta, a vessel which propels the blood to the body, arising, in all warm-blooded animals, from the left ventricle, and not from the right as in the reptilia. The blood cannot pass through the lungs except the animal breathes; consequently, no circulation could go on as long as the animal was under water: but from the peculiarity of the structure of the heart, we find that the blood passes directly from the right auricle to the right ventricle, whence the aorta arises, and the blood is sent straight on to the body again, without passing through the lungs, as in warm-blooded animals. This circulation, however, cannot go on ad infinitum, with this decarbonized blood, and the reptile is obliged to seek the atmosphere at certain intervals, to take in supplies of air. I do not agree with Blumenbach entirely, when he supposes that the general or corporeal circulation alone goes on when the reptile is under water; since the peculiarity of the lungs of the amphibia enables them to take in a supply of air which will last for a considerable time, and hence some degree, if not a perfect one, of arterialization of blood goes on when the animal is under water, as well as when he breathes atmospheric air. We may suppose, however, that a less quantity of blood passes through the lungs during the time the animal is under water, than when breathing air, and consequently the blood must be more imperfectly decarbonised at this time than at others, though under all circumstances the blood of the reptilia is of a lower temperature and of less stimulating character than in the animals of the classes of the aves and mammalia.

L. P.

ANIMAL PROGNOSTICS.

EVERY observer of Nature must have often remarked with what certainty many animals give signs of a change in the weather. Those signs are, with us, most conspicuous in the summer; and it is of rain, and not of fair weather, that they are given. Swifts and Swallows, though not one has been seen on the wing during weeks of drought, fly with ceaseless rapidity; and the former shrink from the top of the sky whenever the clouds above them are elaborating rain, and especially if that rain is accompanied with thunder. It is true that these birds do

not fly with so much assiduity, and indeed do not make their appearance during the day, until the cloud is formed, and the sky overcast. But then, it is not the darkness alone which brings them abroad; for the mere cloud of day may darken the sky fully more than the incipient rain-cloud, and yet not a Swift shall be tempted to take wing. There is no doubt that these birds come forth to feed; and consequently their insect prey must have the same feeling of the coming rain as they themselves have: but why insects should rise so high into the air, at these times, as the elevation at which the Swifts are found hawking, is a matter which we cannot easily determine.

Almost all birds which have been silenced by the drought renew their songs upon the approach of rain. Domestic poultry, also, make more noise than on other occasions; and the cackling of Geese, the gabbling of Turkeys, the wailing of Guinea Fowl, and the screaming of Peacocks, are blended together in full chorus. It is somewhat remarkable that Chanticleer does not sound his silver bugle upon these occasions, but reserves it to welcome the day-spring from the east. Indeed, when the others are all in bustle and activity, as if rejoicing at the coming rain, he and his companions betake themselves to the roost, or at all events look out for shelter. There is something worthy of notice in this. Geese and Turkeys are the most joyous inhabitants of the farm-yard upon these occasions. Geese are everywhere natives of humid places; for though they are, perhaps, the least aquatic of all web-footed birds, they do not thrive if they have not access to water. Turkeys, too, are natives of the forests of North America, in which humidity is the prevailing character of the atmosphere; and it is by no means improbable that the rapid decrease of wild Turkeys in the settled parts of the United States, is as much owing to the dry air which has been produced by destroying the woods, as to the vigilance of Jonathan with his rifle. The common domestic Fowl, on the other hand, is a native of the jungles of India, where drought is the prevailing character of the climate; and their plumage suffers more from rain than that of any other bird with which we are acquainted. The Guinea Fowl comes from a country of a somewhat intermediate character; its native zone being that between the northern and southern trade-winds, where the atmosphere is not under the control of either of the general currents; and thus it is easily disturbed by the production of heavy showers, by local causes.

Many other instances of prediction of the summer rain-storm, in animals freely exposed to the atmosphere, will occur to the reader; and it will always be found that animals which are pleasurably excited on such occasions, are originally natives of moist climates, or of humid places; while those which are painfully excited inhabit the dry country, and suffer from exposure to rain. We have a remarkable instance of this in the domestic Cat, whose face-washing and general trimming of her fur, has been the cottage barometer time out of mind; and the observation has been too repeatedly made to be doubtful. This operation of the

Cat is performed equally whether the animal is snugly housed beside the cottage fire, or out of doors, exposed to the air. It happens, too, sooner before the actual fall of rain, than the prognostics of most other animals. In this last circumstance there is a philosophical truth, which it is desirable that some intelligent reader of *The Naturalist* would work out and give to the world, through its pages. The domestic Cat is, of all animals with which we are very familiar, by far the most electric; that is, the most susceptible to electric action. Clear and dry air is well known to be a non-conductor of electric action; and the more dry and clear the air is, the more agreeable to Pussey. It is, indeed, highly probable that the love of dry air, as much as the love of heat, brings the Cat to bask by the fire when the air is damp and raw: but the subject has not been studied with the attention which it deserves, for, strange though it may seem to some, the Cat may be of more real service to the philosopher, in the study of meteorology, than it was to Whittington in acquiring that wealth which enabled him to purchase the triple mayoralty, or to Katerfelto in assisting him to impose upon the credulity of the multitude, as a conjurer,

“At his own wonders, wond’ring for his bread.”

For the investigation of so delicate a fluid as the atmosphere, in the variations of its electric state, as resulting from the quantity of humidity in it, and from its motions, we want instruments of the most delicate kind; and no one will deny that the body of an animal must, under any circumstances, be a far more delicate instrument than any which can be made with hands. The finest of these must still be made of matter; and, consequently, the atmospheric change must be great enough for acting upon matter, before such an instrument can possibly point it out. The feeling of the animal, on the other hand, is not matter, but a result of the organization of matter; and, therefore, it must be sensible down to almost the extreme of smallness in atmospheric change, or in any other agent by which it is affected. Those effects of minute or incipient changes upon delicate animals, require a great deal of caution on the part of the observer; hasty conclusions, ought not, therefore, to be attempted to be drawn from them. They always precede our own observation; and though they are, in themselves, unerring, we must use the same precaution with regard to them as we would do in all other matters of reasoning: and it is this which brings us to one of the essential points of the case—why should the lower animals be more weather-wise than we are?

This is a very important question, not only as it concerns those animals, but as it bears on the highest—the immortal—interests of man. Simple as it, at first sight, appears, it really involves the whole distinction between animals, which have no powers beyond those that result from the organization of material substance, and man, whose noblest powers are those which are exercised by an immaterial

and indivisible, and therefore immortal, spirit. There is no question that, in as far as man is animal, his organization is more perfect, in all its parts, than that of any of the irrational animals; some of these exceed him in one particular application of their powers, and some in another. He has not, for instance, the scent of the Blood-hound, the swiftness of the Antelope, or the wing of the Eagle. But when we take it into consideration that the human body is only the instrument fitted for the use of a superior principle, while the body of the animal is both the principle and the instrument, we cannot fail to perceive that the universality of adaptation of which the human body is capable, is far better fitted for being obedient to all the purposes of an intellectual principle, than if the principal exertion of which it is capable had been concentrated upon some one particular kind of action, as is the case with those animals to which we have alluded, and, indeed, with every animal, except man.

From this general perfection of organization in the human body, we must conclude that if man had been entirely dependent upon animal instincts, as the rest of the living creation are—that is, if there had been nothing intervening between the impression on the bodily sense, general or local—man would have required, and would, according to the universal law which runs through the whole creation, have possessed more perfect instincts, and instincts more sentient to every change of external circumstances, than any other animal whatsoever. But in man there comes in a middle operation between the impression, or the sensal body, and the action; and it depends upon this middle part whether there shall be an action, or even a feeling, of the system, consequent of the impression upon the sense. This is a beautiful part of the physiology of man, and a part which gives him great advantages in a mental point of view. If man had been compelled by instinct to obey, or even to feel, every little variation or casualty from without, he could never by possibility have had repose and quietude enough for carrying on any elaborate process of thought. The temperature, the pressure, the motion, the humidity, and the electric state of the atmosphere by which our bodies are surrounded, at all times and at every point, are in a state of perpetual change; and if man had been sensitive to every slight shade of those changes, his life would have been both unprofitable and miserable. The gentle breeze would have shaken him as with an ague; the summer sun would have scorched him into agony; and the winter frost would have chilled him to an icicle.

We have approximate proofs of this in those whose bodies have an extreme degree of sensibility, or who are, as it is popularly denominated, of a nervous temperament; and all of us—except such as have the general structure of their bodies knit and sinewed by habitual exposure to the variable atmosphere, or are placed in an atmosphere so artificial as that the natural changes which are going on without have no effect upon them—at times feel, in our own systems, the pain of this kind of sensibility. This pain, though we often cannot give it a name, or assign it a local seat in any one part of the system, is torment to us beyond the

suffering of ordinary physical disease. We are ill we know not of what ; and yet the sensibility of the system is so unimpaired by our indescribable illness, that acute bodily pain would be deliverance from such suffering.

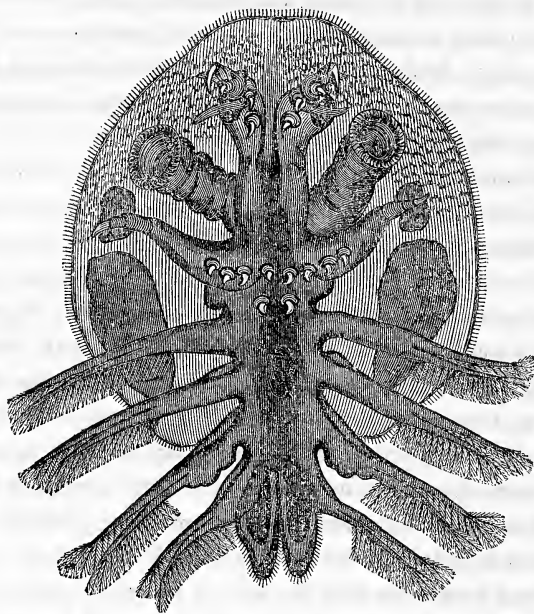
A future opportunity may occur for inquiring into the peculiar tone of the sentient system in man which is most accordant with efficient mental operation ; but we may, in the mean time, remark that this is a medium state, and that the bodily sensibility may be either too dull or too acute for the exercise of vigorous thought, or the performance of useful action. If it is too obtuse, the mind does not receive the impression, and, of course, neither thought nor action can follow ; and if, on the other hand, it is too acute, the anguish of the bodily feeling makes so strong an impression, that the mind is incapable of applying its common mode of judgment, by analogy, to the cause of the impression, and its effect external of the body. It is the mental operation which is injured both by too much obtuseness and too much acuteness of the sense : and in each case the conduct of the human being approximates that of a mindless animal ; and in the extreme cases the approximation may be so close that no observation can draw the line of distinction between them.

It is these extreme cases of insensibility and sensibility of the body, to which the names of idiocy and mania are given. In common language, we call both of them mental derangements ; but no word can be worse applied. The mind, in order to be immortal, must be perfectly simple, and incapable of any division of parts, even in imagination ; because, if the existence of separate parts were imaginable, the separation of those parts would also be imaginable ; and this separation would be the death of the mind, and man would be brought down to the level of the beasts that perish. But, if composition be inconsistent with our original idea of mind, mental derangement must be equally so ; for it is not possible to derange one single existence, be that existence what it may. To return from this digression, which, however, is far from being an useless one : we can see how wise and how good it is that the sentient part of the human frame is so tempered that it does not habitually break in upon the operations of mind ; and, because we are worse barometers than the animals which we have mentioned, and, indeed, than all mindless animals, we are thinkers and philosophers, and they are not.

The animal which has the action instantly consequent upon the sensation, without any intermediate mental judgment by comparison with former experience, is, of course, wholly at the mercy of external circumstances, and compelled as necessarily and as instantly to obey every change of these to the full amount of its influence, as a fragment which the lightning shivers from the precipice is necessitated to descend by the force of gravitation. It is this perfect obedience of the system of mindless animals to the circumstances of Nature external of them, which renders the study of them so very valuable for meteorological purposes ; and this study deserves far more attention than it has hitherto received.

OBSERVATIONS ON THE ARGULUS FOLIACEUS, (JURINE),
AS INJURIOUS TO GOLD AND SILVER FISHES.

By MISS DOBSON.—(COMMUNICATED BY MR. GEORGE SAMOUELLE).



GENUS 85. ARGULUS, Müll., Jurine, Leach, Desmarest, Samouelle:
BINOCULUS, Geoffroy, Latreille.

Shell oval, somewhat membranaceous, semi-transparent, anteriorly rounded, deeply notched behind: two hemispheric *eyes* inserted at the anterior and lateral parts of the clypeus: *antennæ* very small, inserted above the eyes: *rostellum* sterniform: twelve *legs*, unequal in size and form; *first pair* shorter, very membranaceous, capable of changing their form, broader at their tips, and constructed for adhering to objects; *second pair* prehensile, curved, much thicker towards their base, the thighs furnished with three spinules beneath; *tarsi* of the second pair three-jointed, the last joint with two claws and a pulvillus; *four hinder pairs* inserted at the sides of the abdomen, somewhat cylindric, formed for swimming, with their points bifid: *abdomen* cylindric; *tail* bilobate.

SP. 1. *Arg. foliaceus*, Jurine.

Argulus delphinus, Müll., *Entom.*, 123. *Monoculus Argulus*, Fabr., *Ent. Syst.*, 489. *Argulus foliaceus*, Leach, *Suppl. to Encycl. Brit.*, p. 405.; Desmarest, *Considerations des Crust.*, p. 329, pl. 50, fig. 1, a. e.

This species, which is the only one of the genus that has hitherto been noticed, inhabits ponds and rivulets, adhering to the larvæ of frogs and to fishes, particularly the pike. The larva has been described, by Müller, as a distinct species, under the name of *Argulus charon*: in this state, it differs from the full-grown animal in size, and in having four cylindric, equal, biarticulated, pectinated oars, two of which are attached to the animal above the eyes, and are furnished at their tips with four setæ; the other two, below the eyes, being terminated with three setæ: the two anterior legs are incrassated, elongated, and terminated by a strong bent claw.

The full-grown animal lays from one to four hundred eggs, which are yellow, ovate, and smooth, being generally deposited on stones, in two contiguous, longitudinal series. These eggs are hatched in about thirty days. The perfect animal is a most beautiful and highly interesting transparent object for the microscope.*

The following are the observations of Miss Dobson, on this singular parasite. "I took a gold fish out of a pond, that had been in a very sickly state for two or three months. Thinking it nearly dead, as it was lying on its side on the surface of the pond, I put it into a pan of water; and in an instant I saw a diminutive insect swimming about very actively. I immediately examined a portion of the same water, supposing the insect might have bred in it, and that I should find more of them: I was, however, mistaken, the water being perfectly clear. I returned to the gold fish, and found the number of insects increased; which led me to imagine they must have come from the fish. I therefore examined it, and perceived that the fins were perfectly covered with them, and several on different parts of the body. Finding I could not brush them off, I took the animal in my hand, and was obliged to scrape them off with my nail, they adhered so tightly. The fins were very much injured, being divided into threads; and one quarter of the tail was quite eaten away. The fish was greatly swollen; the scales stood erect; and the flesh between the scales had the appearance of jelly. It breathed with such difficulty, that I expected, in a short time, to find it dead: I was, therefore, much surprized on the following morning, to perceive the fish still alive, and a little improved; but the water smelt quite putrid, from the diseased state of the fish. By changing the water every day, the fish improved so wonderfully that the scales began to assume their proper condition, the swelling gradually decreased, and it became very lively; catching at some worms thrown into the water, and shaking them as a cat does a mouse. Having heard that fishes were very fond of graves in clay, I put a small ball into the dish. On the following morning, to my great regret and disappointment, I found the fish dead. Had it not been for this injudicious treatment, I feel persuaded it would have recovered.

* Samouelle's *Entomologist's Compendium*, second edit., p. 126.

"Immediately after I had relieved the fish from the insects, I placed one under my microscope; and no longer wondered at the difficulty I experienced in removing them from the fish. On each side of the throat is fixed a large hollow tube, capable of expansion and contraction to a considerable degree, imparting a wonderful power of adhesion, which enables the insect, notwithstanding its diminutive size and delicate formation, to hold so firmly to any substance as to require some force to remove it. The mouths of these tubes are very beautifully formed, being fringed all round with hair, folding over the edge or lip. Independent of these extraordinary tubes, they are provided with eighteen strongly-formed hooks, no doubt wonderfully provided to resist the violent agitation of the water. On the top of what I consider to be the antennæ, is placed a very long, sharp, pointed hook, apparently of a horny substance, very suddenly bent downwards. The horn seems to be placed in a socket or band, which the insect has the power of turning round at pleasure. In the middle of the horn, and on the band or socket, are likewise placed two more short, strong hooks; two between the horns, two much lower on the breast, below which are two more. Extending from each side the body (independent of four forked legs, or paddles, which are thickly fringed with strong hairs) is an arm, or fore-leg, with three socket joints, very thick set towards the body; on the elbow of which



are placed three of the same powerful hooks as above stated. The legs, or paddles, are kept in constant movement; the body terminates in an elegantly formed tail, partially divided. The eyes are large, prominent, and very beautiful, situated on each side the horns, arranged in rows, with a distinct division between each row, apparently as though they were a

number of brilliant globes, or precious stones, floating in jelly, and enclosed in a transparent skin: they have likewise two pairs of palpi, or feelers, one behind, the other below, the horns, which I should not have discovered, from their being so extremely delicate and transparent, had I not had such frequent opportunities of observing the insect in a living state, under various different powers. The mouth is a long tube, extending from the centre of the forehead almost down to the breast, capable of expanding and contracting to a considerable length, in the form of a proboscis. The back of the insect has the appearance, in form, of the *Cassida*, or Tortoise Beetle, only of a soft flexible texture, without any division, or wings: on the under side of which it is wonderfully provided with numerous clusters (particularly round the head, tubes, &c.) of strong, but small, hooks, perfectly formed, which might, at first, be mistaken for hairs, until submitted to a strong magnifying power.



"After taking the insects from the fish, I left them in the same water till the following morning, by which time it had become quite offensive; before changing it I attentively, and for some length of time, observed their different actions; and

perceiving one of them more agitated than the rest, I watched it particularly, and fancied, what proved in reality to be the case, that it was casting its skin. Had I not witnessed this operation, I should have been deprived of much information and gratification. Notwithstanding the skin is so delicate, and when in the water so purely the same colour, a close observation afforded me the opportunity of collecting as many skins, during the time I was able to retain the insects alive, as, I think, were thrown off. The next object that struck my attention, was the appearance of a cluster of minute eggs, floating on the surface of the water, encircled by something that had the appearance of oil ; specimens of which I placed on two glasses.

“ On placing the cast skin under the microscope, I observed that each hair with which the legs or paddles are provided, was thickly set on each side with a row of fine hairs. I could not discover in the cast skins any portion of skin that could cover the eyes ; the thin transparent membrane, therefore, that covers them in the perfect insect, has no appearance of net-work, as in most other insects.

“ The insects became gradually weaker, and in four or five days they all died. I took a sketch of one before it was quite dead, which I think will convey a tolerable idea of the animal in its living state ; as those prepared as specimens on glass, although very beautiful, do not, in consequence of their dried state, convey to the observer a correct idea of the insect without such aid ; the cast skin assists, likewise, in its developement.

“ The circulation of the blood, with a high magnifying power, was particularly interesting.”

Mr. Samouelle has subjoined the following additional observations :—“ On Sunday, May 20, 1836, I caught two insects, male and female, the latter full of ova, which, in the course of the same night, were deposited on the sides of the glass, in a cluster, to the number of seventy-nine. In order to give the insects food, I tried the experiment of their feeding for a time on the dead gold-fish, which they did for two days ; when, on their appearing rather weakly, I removed them from the fish, and the water becoming impure, I restored them to the glass where the eggs were deposited ; they became evidently refreshed, and the female hovered over and about the spot where the previous eggs were laid, and in the course of the same night she laid twenty-four more, and, after a short time died. By way of experiment, and as a resource for food, I had some minnows caught for the other, to see if it would feed upon them. It remained in the vessel for two days, when it disappeared, and I suppose it was eaten by the minnows. The eggs still remain unhatched, June 13th.”

The engraving at the commencement of the article represents the *Argulus foliaceus* magnified, and of the natural size.

OBSERVATIONS ON THE SCARCE SWALLOW TAIL,

(*PAPILIO PODALIRIUS*.)

By J. E.

As the Lepidoptera are more attractive than the generality of our native insects, and as the butterfly has "found favour even in ladies' eyes," the announcement of the capture of one of the rarest and most elegant, the scarce Swallow Tail, *Papilio podalirius*, will be hailed, we doubt not, with joy, and still more happy will he be who can obtain a specimen of it. In a late number of Mr. Curtis's *British Entomology*, a specimen of this *Papilio* has been figured, which was taken near Windsor, by W. H. Rudston Read, Esq. and others have lately been purchased, as British, by G. Robertson, of Limehouse, and Dr. Bromfield, of Hastings. The principal object of calling attention to this subject is the hope that when this butterfly is generally known, others will come forward and furnish additional proof of British specimens having been taken; for although, like many others, it only appears occasionally, yet when seasons are congenial to its habits, it will appear probably for many successive years. It is now known to be found at Hamburgh, which is as far to the north as York; therefore, the erroneous idea that its northern range renders its appearance here impossible, is no longer tenable. There is one thing, however, that collectors ought to be warned of, *P. podalirius*, and many other insects rare in Britain, are common enough on the Continent, and are easily obtained from thence, even in the larva state, and we are sorry to have reason to believe there are individuals who see no objection to selling such as British, in order to enhance their value.

THE ALYSSUM CALYGINUM.

The *Alyssum calycinum* has been lately discovered in Charnwood Forest, about half way between Gracedieu and Whitwick, in a botanizing excursion, by the Messrs. Churchill and Arthur Babingtons, and the Rev. Andrew Bloxam. It was found growing sparingly in a small field adjoining some rocks, amongst *Medicago lupulina*. Specimens have been sent to Mr. Watson, Professor Henslow, and other eminent botanists. This is the first time that the plant has been noted as growing in England. It was, however, discovered in two places in Scotland last year, at Dirleton Common, Haddingtonshire, and on the coast of Forfar, and a notice of it communicated to the *Edinburgh New Philosophical Journal*, by Professor Graham; it is also introduced into Mr. Watson's remarks on the distribution of British plants.

ON THE FEN REEDLING,

(*SALICARIA ARUNDINACEA*, SELBY), REED-WREN, OR REED-WARBLER,
OF OTHER ORNITHOLOGISTS.

BY EDWARD BLYTH.

HAVING some reason to suspect that this lively little songster is more generally diffused over the country than is commonly supposed, and apprehending that few distinguish its chant from that of the Sedge Reedling (*S. phragmitis*), I am induced to offer a few observations to the attention of naturalists residing in districts where it has been hitherto undiscovered, in the expectation that they will lead to its detection in many localities where its presence has, as yet, been quite unsuspected.

Of course it is unnecessary here to describe the plumage and technical character of the species, as these will be found in most works on British ornithology. Bewick, however, omits to figure the bird, but annexes its name to a representation of the Sedge Reedling, obviously confounding the two together. The Sedge Reedling abounds in watery situations all over the country, even to the northernmost districts of Scotland; and no person of the least observation can be otherwise than familiar with its abrupt and chattering, but certainly not unpleasing, song, with which it incessantly enlivens every ditch, continuing to do so until about the middle or latter end of June; after that time it is seldom heard. It is a strange medley of a song, though, at the same time, it is altogether original; combining a characteristic *chiddy, chiddy, chit, chit, chit*, with a very sparrow-like *chou, chou*, and an occasional and emphatic *peet-weet*, reminding one forcibly of the Chimney Swallow. Then comes, perchance, a series of harsh, jarring tones, followed, perhaps, by a seeming imitation of something else; and not unfrequently the bird mounts, singing, a little way into the air, or chirrup as it flits from bush to bush, or from willow to willow. I am sure that there are very few who will not immediately recognize it from this description; more particularly if they have been accustomed to perambulate marshy and sedge-tufted places, during the spring and summer.

The extremely passerine character of many of this little bird's chirpings, have gained for it, in various places, the vulgar appellation, "Reed Sparrow;" just as the homely garb and familiar manners of the common Hedge Dunnock, another bird of slender bill, have occasioned the equally erroneous but popular name, "Hedge Sparrow," to be its ordinary cognomen.

Now, I certainly am not one of those who are willing to accept any kind of name, merely because it chance to be popularly applied. Undoubtedly there should be some rules for nomenclature, some system to regulate caprice. If any

meaning is to attach to the word "sparrow," if it is to signify a particular form among the feathered race, surely those species ought alone to be called *sparrow* which exhibit the characters briefly denoted under that name. To apply it to birds of other form occasions only unnecessary confusion. If a new species were to be denominated — *sparrow*, we should, of course, expect it to pertain to the genus *Passer*; and why, therefore, do some naturalists persist in using erroneous appellations, merely because, in some districts, they happen to be popular? I say *some districts* only, because there are really very few names which are in general use throughout the country; consequently a classical and systematic nomenclature is doubly needed. In the south of England, for instance, what terms appear to be more universally accepted than *Goldfinch*, *Tomtit*, and *Kingfisher*? Yet the first applies, in Yorkshire, to the Yellow Bunting, the second, in the same county, to the common Wren, and the third, in Sutherlandshire, invariably denotes the Dipper. Not long ago, I heard a ludicrous dispute between a Yorkshireman and a native of Surrey, respecting which bird was the "Tomtit," the former insisting that the southron's *Tomtit* meant the *Blue-cap*! What we in Surrey term the *Goldfinch*, is, in Yorkshire, better known as the *Thistlefinch*; in Suffolk and Norfolk it is as popularly designated *King Harry*, and in Scotland it is the *Gooldie*, or *Gould-speuk*, of our northern neighbours. But while I advocate a well-digested and temperate reformation of the vernacular names to objects of Natural History, let me by no means be understood to adopt every ill-sounding name which some nomenclators, in their great enthusiasm, have proposed. At some future time I shall probably take the subject in hand myself, and hope that whatever new names I shall then have to offer, will not only possess the merit of propriety and exclusiveness of application, but will, also, not offend the more fastidious, by their want of euphony. It will, also, be my object to introduce as few new terms as possible, as I see no occasion for substituting "Goldwing" for *Sickin*, as the vernacular for *Carduelis*, "Treeling" for *Pettychaps*, &c., as some have done.

But to return to what in Surrey is called the *Reed-sparrow*. Our naturalists are mistaken in supposing that people in general (that is to say, unscientific observers of discrimination) ordinarily confuse, as professed *naturalists* have done,* the Sedge Reedling with the Reed Bunting. I have generally found that both birds were well known, and their respective notes also. I believe they will be found everywhere to be distinguished by separate names, and in Surrey the Reed Bunting is called "Blackheaded Bunting;" as good a name, without reference to its foreign congeners, as the more exclusive one now judiciously employed by all our naturalists.

The Fen Reedling, however, about which the present paper is *professed* to be

* Witness the various accounts of the Reed Bunting's *song*.

written, is very commonly confounded with its congener, by observers of all descriptions, when in its native haunts. In the hand, the two species are sufficiently dissimilar, and, for members of the same very natural genus, are by no means closely allied; but, in the bush, a little attention is necessary to discriminate between the two, and our naturalists are, I think, generally culpable, for not describing, with more precision, how they are then to be known apart. Thus, Montagu simply informs us that "their notes are similar;" forgetting that this very similitude rendered it doubly incumbent on him to point out whatever difference there may be between them, as most of his readers would, doubtless, be much better pleased to be enabled to distinguish the two in their native wilds, than as mere cabinet specimens, removed from their places in nature. It should be the constant aim of the ornithologist to pourtray his various subjects as they appear in their wild haunts, in order that his readers may at once recognize them in a state of freedom. In this respect, many of Mr. Mudie's eloquent descriptions may be cited as absolute models of perfection.

The Fen Reedling's notes are, most undoubtedly, very similar to those of its congener; but may be distinguished by a little attention to the following particulars. The song is even more hurriedly delivered, and is, also, more continuous; there are no harsh discordant chirpings, no apparent imitations of the Sparrow or Chimney Swallow; at the same time, the chant is certainly less varied, and, indeed, consists but of an incessant repetition of a number of detached chirrups, some of which are, however, by no means unmusical. This, also, is kept up night and day, though less habitually in the night season than that of the Sedge Reedling; and it is never uttered with more emphasis than when any one is very near the nest, an incident which provokes many of what are commonly termed "the Warblers" to sing loud, particularly the Blackcap and other Fauvets, as most bird's-nesting persons must have often noticed. The Fen Reedling sometimes chirrups on the wing, as it passes from one bush to another, but I believe it never rises singing into the air, like its only ascertained British congener. It also continues to chatter much later in the season than the Sedge Reedling, and may be heard till about the middle or third week of July; wherefore those observers who may have fancied that they have heard the Sedge Reedling until this period, will do well to entertain at least a suspicion that it was *S. arundinacea*, that is to say, if they were not previously well acquainted with the notes of the latter species.*

* I have since heard a Sedge Reedling pertinaciously chattering on the 20th of July, but during a refreshing thunder-shower, succeeding a long period of drought; a juncture at which, of all others, the feathered race are particularly musical; (see Mudie's description of the Green Woodpecker). Although many Fen Reedlings were in the vicinity, they were all silent, and I heard only that one Sedge Reedling, where, a few weeks before, both species would have vied in garrulity. As a general rule, therefore, this does not affect what I have above stated. The same evening, the Fen Reedlings were singing in the

Some writers have made out the Fen Reedling too *exclusively* an inhabitant of reedy places, which, after all, are not its most favourite habitat. No doubt it is commonly found in such situations, and frequently suspends, or rather fastens, its nest to a few contiguous reed-stems, as I have seen repeatedly; but I have more commonly observed it in tall bushes growing near the water, and sometimes placed against the trunk or large branch of a willow or poplar, interlacing one or two upright side shoots. When there are gardens adjoining its haunts, it very commonly selects a lilac-bush, and in such localities the nest will be rarely found among the reeds. I have now a beautiful specimen before me, which is fastened to a single slender stem of elder, from which, within the centre of the fabric, issues a young green shoot, the extremity only of which is visible.* One, described by Mr. Rennie, was situate within a tuft of lucerne, and, consequently, very near the ground; but I have seen them at a height of ten, twelve, and even fifteen feet from the surface, placed amid the perpendicular shoots of willow or lilac. This species is very partial to gardens in watery situations, and will usually admit of a much closer approach than its congener; but still, the glances one is enabled to get at it are so momentary, and oftentimes against the light, that unless our suspicions are aroused, it is seldom that an unpractised eye can tell it readily from the Sedge Reedling. Its bill, however, is considerably larger, and the whole plumage of a much more uniform tint, without the pale streak over the eye, so conspicuous in the other species.

The Sedge Reedling's nest is always placed near the ground, amid a thick tuft of herbage, or among the shoots from a low stool of willow: it is of somewhat massive construction, a great deal of material being worked up, and the cavity deep, containing often as many as seven eggs, of a pale ground colour, thickly besprinkled with small, confluent, greenish specks, which, at the large end, often form a zone; sometimes a few larger ash-coloured spots are observable, and, not unfrequently, some blackish dashes at the large end, which may be easily washed off by simply wetting them: a mode that will obliterate many of the darker markings upon the eggs of birds. The young of this species differ very little from their parents, but have a number of dusky spots upon the breast. Interior of the mouth bright orange.

same place, with very great spirit; which confirms an observation I have often made, that night-singing birds always continue their notes longer by night than in the day-time.

* I have subsequently seen a nest about which was wound a long piece of fishing-tackle. This nest was situate about twelve feet from the ground, and was fastened to some slender twigs of *Viburnum*: in construction it more resembles those specimens which are built among the reeds, being otherwise chiefly composed of the seed-tops and softer leaves of reeds and sedges, without any moss or cottony substance interwoven. It is, however, considerably less compact and neatly finished than that described in the text, and contains a less quantity of material. Those in the reeds are mostly of elegant formation.

The nest of the Fen Reedling also contains a good deal of material, but more compactly and beautifully interwoven. It is also very deep, whether it be placed among the reeds, where it is liable to be blown about by the winds, or amid the clustering, rigid stems of the poplar, when perfectly secure from such annoyance. The eggs are most usually five in number (more than which I have never known), of a pale, greenish white, blotched all over, and spotted with greenish brown, and sometimes a few spots of ash colour: there are likewise commonly some dark marks at the larger end, which, as in those of the other species, may be soon obliterated. The young are altogether more rufous than their parents, particularly on the throat and under parts, but have no trace of the breast-spots observable in the other, and the interior of the mouth is yellow; there are also two large black spots upon the tongue, which are very conspicuous when the young open their mouths for food. Both species leave the nest remarkably early, before their feathers have half attained their proper development. The notes of the young of both are harsh and dissonant.

I do not conceive it necessary to enter further into the history of these little birds, as might be done at considerable length: should the Fen Reedling occur in the vicinity of any reader of this article, he surely will not now fail to detect it. I am very desirous of ascertaining, with accuracy, how the migratory land-birds are distributed over the country; a fact which can only be satisfactorily elucidated by the co-operation of naturalists resident in different parts. At present there is a good deal to be learnt on this subject.

I have termed this species "Fen Reedling," as I think it is rather more expressive of the precise nature of its haunts than *Marsh* Reedling, which has been proposed. The words are, undoubtedly, nearly synonymous, but the latter had better be reserved for *S. palustris*, an allied species, not hitherto found in Britain. In the fenny counties of England, and in Holland, the *S. arundinacea* is an exceedingly abundant species, and, according to Mr. Neville Wood, it occurs, in this country, as far north as Derbyshire: how far beyond this I wish to determine, and have penned the present article in the hope of ascertaining.

ON THE PAPILIO MACHAON,

BY J. CURTIS.

OF all the various sources of gratification arising from the study of insects, none appears to me more interesting than the rearing of them, very especially the Lepidoptera. We are enabled at our leisure to investigate and study their wonderful economy, and at the same time to obtain the most perfect specimens for our cabinets; thus enhancing the beauty of the collection, and securing perfect insects for future description.

It was my intention to have offered some *general* remarks on the pupæ or chrysalides of that favourite family the Papilionidæ ; but I find that, in the present number, I must content myself with describing the process of the caterpillar of *Papilio machaon*, in changing to the pupa state. The caterpillar of this truly elegant and graceful insect (one of the two species of *Papilio* which we can alone lay claim to as British) having fixed upon a spot where he intends to take up his abode for the period of his imprisonment, turns his head on one side, and attaches a thread, which he carries over to the other, where he also fastens it, and returns again and again, backwards and forwards, until it has acquired a sufficient thickness to sustain his weight. The caterpillar now, having laid hold with his anal feet, is supported by these combined threads, which pass under the junction of the thorax and abdomen ; and, by a violent muscular action, the skin of the caterpillar bursts at the head, and it is pushed or thrown off like an elastic garment. Having seen this remarkable process accomplished, I was curious to know by what means he could fasten the apex of the abdomen to the box ; and, from the observations which I was enabled to make, I feel satisfied that it is by ejecting a glutinous fluid through the pores of the tail, which is the analogue of the anal feet, for, the skin being cast off, he placed the apex of his body close to the box, to which it instantly adhered. I then detached it, and again it firmly united ; but a third trial had probably so exhausted its powers, that it afterwards remained suspended by the thoracic chord alone.

MUSIC OF SNAILS.

THERE is a poetical notion that Oysters, amongst other gentle qualities, love minstrelsy, and the fishermen, in some parts,

“Sing, to charm the spirits of the deep,”

as they troll their dredging nets ; for

“The Herring loves the merry moonlight ;
The Mackarel loves the wind ;
But the Oyster loves the dredging song ;—
For he comes of gentle kind.”

These lines gave rise to a communication from a young lady, which I will send you. Perhaps some of your readers may confirm the supposition of the Snail's musical capabilities. She says :—“One evening I kneeled upon the window seat, when it was nearly dusk, and heard a soft *musical* sound ; not a humming or murmuring, but a truly musical tone. I saw a Snail, and, having a desire to annihilate those destroyers of fruit and flowers, took it from the window. I had silenced the music ! I recollected what I had heard, and felt a sort of pang.”

S. KENNAWAY.

NOTICE OF THE REPORTED CAPTURE OF THE COMMON GAR-PIKE (*BELONE VULGARIS*) IN THE RIVER TAME.

IN the month of April last, I received from Mr. Richard Bird, Surgeon, of Tamworth, a fine specimen of the common Gar-pike, said, by the man from whom he obtained it, to have been just caught in the River Tame, about two miles below Tamworth. That a sea-fish not mentioned, by any Ichthyologist with whose writings I am acquainted, as ever frequenting fresh water, should have ascended an inland river, to the distance of about one hundred and fifty miles from its termination in the ocean, appeared to me a somewhat extraordinary fact : and I should have been induced very strongly to suspect the correctness of the statement made to Mr. Bird, had not that gentleman, who is a very accurate and cautious observer, assured me that the fish exhibited the peculiar silvery lustre, and all the other characters of freshness, which indicated that life could not have been, many hours, extinct. I have, this day, seen Mr. Bird's informant ; and questioned him very closely on the subject. He states that he took the fish, given to Mr. Bird, and another, considerably larger, of the same species, with a net, in the river Tame, just below Hopwas bridge ; that it is the only instance of the capture of such fish in fresh water, which has fallen under his observation ; but that an old fisherman, of Tamworth, recollects having taken a Gar-pike, about twenty years ago, in the river Tame, near Hopwas.

I shall feel much obliged by the communication, through the medium of *The Naturalist*, of any fact calculated to throw light upon this obscure and, in my opinion, still somewhat doubtful statement. That such a fish as the Gar-pike, which, however agile and vivacious, is not known to possess the saltatorial powers of the Salmon, should have made its way over the numerous weirs existing on the course of the Tame and Trent between Hopwas and the point of conflux of the latter with the Humber, it is difficult to conceive. A few weeks previously to the date of this reported capture, the Trent and its tributary streams had, I may, however, observe, been swollen to an unwonted height by the rapidly-dissolving snows, and profuse rains, of the early spring.

I shall conclude my brief notice with a slight outline of the generic and specific characters of this curious fish, and an exposition of the site which it occupies in the modern systems of Ichthyology.

The Gar-pike, associated, in the System of Linneus, with the common pike, under the title of *Esox belone*, has, of late, been separated from *Esox*, and taken as the type of a new genus, named *Belone*, from *Βέλων*, the Greek designation of the gar-pike. The following are the generic characters of *Belone* ; as traced by Fleming and Yarrell. Muzzle attenuated and greatly prolonged. Intermaxillary bones forming the entire margin of the upper jaw. Both jaws furnished with minute teeth ; none, on the vomer, palatine bones, or tongue. Along each side

of the abdomen, a row of carinated scales. Dorsal and anal fins entire. Contains only one British species, *B. vulgaris*, the subject of our present sketch: which varies, from eighteen inches to two feet, in length; has the lower jaw considerably longer than the upper; *dorsal fin*, of 18 rays, situated very far behind; exactly opposed to, in situation, and resembling in figure, the *anal*, of 21 rays: *pectoral* of 13 rays, small, and attached a little behind the gill-opening: *ventral*, of 7 rays, still smaller, and situated far back. *Caudal fin*, of 13 rays, and forked. *Colour*: Head, back, and dorsal portion of sides, fine bluish-green. Gill-covers, and other parts of the body, of a bright silvery hue.

The flesh is edible; and said to resemble, in flavour, that of the Mackarel; but, from the circumstance of the bones acquiring a green colour, when boiled, a popular prejudice almost universally exists against its dietetic employment. On this account, also, it is sometimes distinguished by the provincial designation of *Green-bone*: at others, as preceding the Mackarel in its annual arrival on the coast in April, by that of the *Mackarel-guide*.

The ventral fins of the Gar-pike being situated posteriorly to the pectoral, this fish has, consistently with the principles of ichthyological arrangement adopted by Linneus, been placed in his Order *Abdominales*, of true or osseous fishes. Cuvier, in his distribution of this Class, constitutes three Orders of Malacopterygious, or Soft-finned Fishes: of these, the *first*, or *Abdominales*, is distinguished by the attachment of the *ventral posteriorly to the pectoral fins*: the *Second*, *Sub-brachiales*,—by the *insertion of the former below the latter*; and the last, *Apodes*, by the *entire absence of ventral fins*. Consequently, the Gar-pike belongs to the Order, *Malacoptérygiens Abdominales*, of Cuvier's System; and, as nearly allied to the common Pike, the genus *Belone*, to which it belongs, is included, by British Ichthyologists, in the *Esocidæ*, or Pike-family. This genus, as I have before observed, offers only one British species,*—la Bélone, of the French,—and der hornfisch, of German Naturalists. Figures of the Gar-pike are given by Pennant, *British Zoology*, vol. iii., pl. lxxiv.; by Donovan, *Natural History of British Fishes*, vol. iii., pl. liv.; and by Yarrell, *History of British Fishes*, vol. i., p. 391.

June 30th, 1836.

S. P.

* The species, captured by Mr. Couch, at Polperro, and regarded by him,—See *Linnean Transactions*, vol. xiv., p. 85,—as the *Esox Brasiliensis*, or Little Gar, is probably only the young of some other fish: and the Saury, referred, by some Naturalists, to the *Belone* genus, under the title of *B. Saurus*, has been taken by Lacépède, to constitute a new genus; and named *Scomberesox saurus*, by Fleming; See *History of British Animals*, v. i., p. 184. It is principally distinguished from *Belone*, by the division of the posterior portions of the dorsal and anal fins into several finlets resembling those of the Mackerel:—hence the propriety of the generic designation, *Scomberesox*, or Mackarel-pike; and by the bi-carinated abdomen. An admirable figure of the Saury Pike is given, p. 394 of Yarrell's 1st vol.

THE REDSHANK.

By B. R. M.

In my shooting excursions lately, I have not unfrequently met with that very pretty and interesting little bird, the Redshank (*Totanus calidris*) ; and as my observations upon it lead me to conclude its habits and manners to be rather different from what they are, in general, supposed to be, I send you the result, which may, perhaps, be interesting to some of your readers. I confess I was rather surprised at first to find the Redshank always in *very large* flocks, as I had always previously considered it and its congeners to be birds of solitary habits ; but I have very seldom seen it in this neighbourhood in flocks of less than a dozen, frequently amounting even to one hundred and fifty, or two hundred ; and the larger the flock the more shy and difficult were the birds of approach. Indeed, even in small flocks, it generally contrives to baffle and elude the attempts of the sportsman ; as it is always on the look out, and takes wing on the least alarm, or the slightest appearance of approaching danger. Towards the beginning of the breeding season, they are, however, rather more accessible ; for they do not fly very far on being disturbed, but generally alight again a few hundred yards off. The breeding season is the only time of the year in which they are not found in flocks ; at this period they leave the shores, and disperse themselves over the country, in places more suitable for incubation. The tide here, on receding, leaves a very large surface of muddy sand exposed ; and this seems to be peculiarly favourable to birds of this class, and accordingly it is very much frequented by the *Tringa*, *Totani*, *Numenii*, and other birds of this family ; for all these obtain their food in the same situations. The Redshank is, I think, most nearly allied, in its habits, to the genus *Tringa* ; and it has the same kind of dipping motion, when running on the sands, for which the latter is so remarkable. I was very much struck with the curious manner in which they dart their bills into the mud or sand, for the purpose of getting at their food. They seem to bury it in the sand nearly its whole length, by jumping up, and thus giving it a sort of impetus, if I may use the word, by the weight of their bodies pressing it downwards. The bill is about an inch and a half long. The legs are delicate, of a deep orange colour, and long.

Dublin, May 10th, 1836.

REVIEWS.

Recherches Sur les Poissons Fossiles. Par Louis Agassiz. Neuchatel (Suisse). Quarto.

PROFESSOR AGASSIZ, in this elegant and most instructive Monograph on Ichthyolites, proposes, after an introduction on the study of fishes, to "exhibit a view of the Comparative Anatomy of the organic systems, which may facilitate the determination of the fossil species; a new classification of Fishes, shewing the relations which they have with the series of (geological) formations; the exposition of the laws of their succession and development during all the revolutions of the terrestrial globe, accompanied by general geological considerations; and, finally, the description of five hundred species no longer existing (except in a fossil state), and of which the characters have been determined from the relics contained in the earth's strata."

This is a truly comprehensive plan,—the emanation of an active, enterprising, and profoundly philosophic spirit. As far as we can judge from an examination of the First Number (*Première Livraison*) now before us, it has verily been worked out with a master's hand. A production more honourable to the talents and industry of its author, or more useful and interesting to the Ichthyologist, the Comparative Anatomist, and, especially, to the student of Geology, we cannot well conceive.

Of the divers modes in which a book may be reviewed, the Analytical is peculiarly, and almost exclusively, applicable to those scientific productions which have facts, rather than hypotheses, for their foundation. Whenever such productions are, either from the expensive form, or from the language, in which they have been published, inaccessible or unavailable to the great mass of readers whom they are calculated to interest and inform, the motives for the analytical method are greatly and obviously strengthened. Such are precisely the conditions of the valuable *Researches* of Professor Agassiz. The work is, moreover, written in a style which we, who have long been familiar with the scientific language of the French, have at times found it no easy matter to comprehend, or at least render intelligible to the English reader. Consequently, it will afford an admirable subject for a purely analytical sketch, and for the exhibition of our skill and patience,—if such we possess,—in the difficult but useful process of literary evisceration.

The various new branches or departments of human acquirement demand, as they successively arise, new terms for their apt and precise designation. The influence of a philosophical language on the character and progress of the Sciences is far greater than a superficial view of the subject would lead us to believe. The

study of fishes in a living or recent state is, with obvious aptitude, called *Ichthyology*: for that of fossil fishes, we, at present, possess none but a circuitous and consequently inconvenient form of expression. *Ichthyolithology*,* a term alike concise and destitute of ambiguity or objection, is so obviously and peculiarly apposite, that our only wonder is it should have been left for us to indicate or propose.

The whole work of Professor Agassiz will consist of five volumes, in quarto; and two hundred and fifty folio engravings. One part or number, composed of from ten to fifteen sheets of letter-press, and a fasciculus, of about twenty plates, is published every four months. The price of these is, in France, twenty-four francs.

The First Number contains three sheets of letter-press of the first volume; six sheets of the second; two, of the fourth; and one, of the fifth: the first *Fasciculus* of Engravings,—seven belonging to the first volume; ten, belonging to the second; and three each, to the fourth and fifth;—in all, twelve sheets of text, and twenty-three engravings. From this unusual and apparently irregular method of publication, the ostensible object of which is a pleasing “variety,” no inconvenience, the Professor asserts, will result: as all his materials have been, beforehand, systematically arranged.

A Preface, and two Chapters, constitute the subject-matter of the first three sheets of the *First Volume*. To an analysis or description of these, our present article will be exclusively devoted. The work is dedicated in a style of simple, fervid, and affecting eulogy, to the CUVIER of his country, the illustrious HUMBOLDT.

PREFACE. The importance of the study of Ichthyolithology is very great: since fossil fishes, which occupy so elevated a rank in the series of organized beings, are found without interruption, and sometimes in great abundance, in all the *terrains de sédiment*, from the oldest to the most recent formation: and their state of preservation is generally such as to allow an examination of all those parts which are requisite to decide their classification, and to impart a correct knowledge of their structure. With little trouble, the entire skeleton, and all its fins, may be restored: and the scales are, in general, so well preserved as to supply the most valuable and unerring characters.

In the sciences of Zoology, Comparative Anatomy, and Geology, it is highly advantageous to be able to follow, in the Class of Fishes, the changes of organization which have been effected throughout all the revolutions suffered by the globe. Of all animals, fishes are those most intimately connected with the accidents of water: and, highly elevated, moreover, in the scale of organization, they are far better calculated, than any other Class, to furnish clear ideas respecting the revolutions which have taken place in the vast oceans by which the earth was formerly

* ἰχθυός, a fish; λίθος, a stone; λόγος, a discourse.

covered. By the information thus acquired, it is possible to determine whether a fish inhabited river, lake, or pond, the open sea, or the shallow waters ; whether it lived on the surface, or frequented the great depths. These indications may serve to determine divers important circumstances in the formation of rocks.

Another peculiar advantage resulting from the study of Fossil Fishes is, that the examination invariably makes us acquainted with the whole organization, and affords a perfect idea of its pristine condition. Such researches must consequently lead to results much more satisfactory than the study of the *Mollusca*, of which only the shells have been preserved ; and more general than that of the *Mammifera*, the whole skeleton of which is rarely discovered, and that only in the most recent strata. The Reptiles, even when more generally known, can scarcely emulate the fishes in importance : since they are of rarer occurrence, and were developed at a later period in the series of creations.

Fossil Fishes differ according to the great geological formations in which they are found ; and exhibit, in each, a peculiar character of organization sufficient for their determination. They differ the more widely from the fishes of the existing period, as they are found in formations of a more ancient date. All the bony fishes anterior to the chalk, are referrible to genera, which have no longer representatives in the present world : they are invariably characterized by rhomboidal scales covered with enamel. Those of the same formations, which, in the present System, would be associated with the *Chondropterygii*, possess, like the genus *Cestracio*, flattened, dotted, or differently plaited teeth.

Comparisons thus multiplied, justify, in the opinion of the Professor, an alteration in the arrangement of Fishes ; which will frequently indicate affinities hitherto unknown : and the new classification, which he advocates, is intended to expose the whole of the natural relations of fishes with each other, and their succession in the series of formations. General geological considerations, moreover, drawn from the study of these fossils, will exhibit the connection which exists between the organic development of the earth, and that of the different Classes of animals. These ideas will be completed by the organic representation of each of the great geological periods.

Great pains have evidently been taken, by Professor Agassiz, in examining the various organs of fishes found in a fossil state, and in discovering the characters proper for their distribution into families, genera, and species. With this view, he has applied himself, in an especial manner, to the study of the skeleton of fishes, and to the microscopic inspection of several thousands of scales belonging to more than two hundred species of different genera and families.

As regards the publication of the work, the first volume will be devoted to an examination of all the general questions. It will contain an Introduction to the study of Fossils ; an indication of the sources from which the Professor has drawn, in the prosecution of his researches ; and the general anatomy of the

skeleton of fishes, and of all those parts which may contribute to determine more precisely the fossil species. In proposing a new classification of these animals, the Professor will comparatively examine, under their zoological relations, all the fossil species which have been described; the genera to which they belong, and the situation which they should occupy in the Ichthyological System: in fine, he will seek to establish the relations of organization which exist between the fossil fishes of all the geological formations, and those of the present epoch: and exhibit the modifications which this study renders it necessary to introduce into the methodical distribution of fishes.

Each of the four succeeding volumes will contain the description of the fossil species of one of the Orders of the Class. The second volume will comprehend the Order of the *Ganoïdes*; the third, that of the *Placoides*; the fourth, the *Ctenoides*; and the fifth and last, the *Cycloïdes*, of the Professor's classification. All the species will be delineated with great care, and in minute detail; and be accurately compared with the living species which most nearly resemble them; with their skeletons and scales; and, in fact, with all the parts which may serve to convey the most correct idea of them, and to establish most completely their generic and specific characters.

CHAPTER I. includes "*Notices of the Collections of Fossil Fishes which the Professor has, himself, examined; and of the materials which have been placed at his disposal for the determination of the species.*" The long enumeration of these Collections is terminated by an indication of those which it is necessary for the student to visit, in order to acquire a general knowledge of the fossil fishes of the different geological formations. An *Appendix* to this Chapter is occupied by a "*Notice of the Collections which the Professor has not seen.*" In the whole of these, he calculates that a sufficient number of new species may be discovered to increase, by at least one half, the catalogue of Fossil Fishes already known.

CHAPTER II. is devoted to a "*Notice of the works which contain documents upon Fossil Fishes.*" Of the two Sections into which it is divided, the *first*, A. comprehends "*General Works, or particular Memoirs, which treat exclusively of Fossil Fishes:* and B. *General Works, or particular Memoirs, geological, zoological, or paleontological, containing Chapters, or scattered Notes,*" on the same subject. The work of Columna, *De Glossopetris Dissertatio*, 4to., Romæ, 1616, stands at the head of this Catalogue. It is terminated by that of the Spaniard, Torrubia, entitled, *Aparato para la Historia Natural Espannola*, folio, 1754.

The lithographic drawings, which accompany this Number, are executed in a style of extraordinary neatness and elegance: and, if we may be allowed to judge from the few instances in which we have yet had an opportunity of comparing the figure with the original, the correctness is not surpassed by the beauty of the execution.

A Manual of British Vertebrate Animals : or Descriptions of all the Animals belonging to the Classes Mammalia, Aves, Reptilia, Amphibia, and Pisces, which have hitherto been discovered in the British Islands, &c. By the Rev. Leonard Jenyns, M.A., &c. 8vo., pp. 559. Cambridge. 1835.

IN the literature of British Zoology, the want of a work like the present has long been felt. The *Synopsis*, of Dr. Berkenhout, complete and excellent for the times in which it appeared, and valuable to those whose hands were destined to receive it, has long been out of print: and the information which, even when attainable, it is found to convey, is rendered uninteresting, and comparatively useless, by the discoveries and the innovations,—if not the improvements,—of zoological science in this inquisitive and aspiring age. Berkenhout, in the last Edition of his *Synopsis*, enumerated only fifty-four species of British *Mammifera*, including man: while, in the present work, man, with the domesticated, naturalized, extinct, and doubtful species excluded, “the number of described *Mammalia* amounts to sixty-one.” And of the Zoophagous *Cetacea*,—by far the most feebly-executed and unsatisfactory portion of Mr. Jenyns’ work,—two or three well-defined species which inhabit the seas, and occasionally visit the coasts, of Britain, are excluded from the catalogue of the Reverend Author. The whole of the British Vertebrated Animals, in fact, described by Berkenhout, amount only to four hundred and seventy-two: while the species of the five Classes, acknowledged as British by the Cambridge Zoologist, “when added together, give five hundred and eighty-one as the total number;” leaving, in favour of the latter, an increase of one hundred and nine newly discriminated, or newly discovered, species* of British *Mammifera*.

Upon the character and execution of the *British Fauna*, of Dr. Turton, which, with the exception of Pennant’s *British Zoology*, comes next to the *Synopsis* of Berkenhout in order of time, we are unable to pronounce a judgment: a copy of it is nowhere to be had. The name and attainments of its author will, however, sufficiently vouch for the respectability of the work. But thirty years have now nearly elapsed since it was published; and the value of literary productions on the Natural Sciences is far more frequently impaired, than left untouched, by the destructive hand of time. The excellencies and defects of the zoological labours of Pennant are too well known to require eulogium or exposure here. As a work exhibiting far more of a popular than a scientific or synoptical character, the *British Zoology*, indeed, does not legitimately come within the line of our literary retrospect.

	<i>Mam.</i>	<i>Aves.</i>	<i>Rept.</i>	<i>Pisces.</i>	<i>Total.</i>
* Berkenhout	54	245	15	158	472
Fleming	50	264	11	162	487
Jenyns	61	297	13	210	581

Far otherwise with the *History of British Animals*, of Dr. Fleming; which, with all its errors and deficiencies, and after all the unmerited obloquies cast upon it, we are bold and stubborn enough to regard,*—yes, and publicly eulogize,—as a very meritorious and creditable production. The arrangement is, we are aware, confused and highly objectionable, and the characters of many of the genera will not stand scrutiny. Still, the specific characters are traced with a clear and masterly hand: and the *History of British Animals* has, we are confident, done much to facilitate and promote the study of zoological science in this country. The total number of British *Vertebrata*, we may add, enumerated or described by Dr. Fleming, amounts to only four hundred and eighty-seven; leaving a majority of ninety-four species for the Catalogue of Mr. Jenyns. (See note, p. 46).

Lectures on the Vertebrated Animals of the British Islands, published in 1831, by Dr. Shirley Palmer, next claim our attention. The very easy, popular, and even playful style in which this little work is written, would preclude its introduction into a strictly scientific retrospect; were it not for the *Table* of British *Mammifera* by which it is preceded, and the generally accurate and useful *Synopsis* of the various genera and species appended to it in the form of notes. In this table, and these notes, Dr. Palmer has enumerated and characterized sixty-five species of *Mammifera* belonging to the British islands. If to these are added the ten new species of the Bat-family described by Mr. Jenyns, the Oared Shrew, *Sorex remifer*, and the Bank-Campagnol, *Arvicola riparia*, first noticed by Sowerby and Yarrell, the catalogue of British *Mammalia* would be swelled to seventy-seven,—a number which exceeds, by sixteen, the whole of the vertebrated animals specified, by Jenyns, as inhabiting Britain, or frequenting its shores. From the period which has elapsed since the appearance of the first Part of Dr. Palmer's *Lectures*, there is little probability that he will now complete them.

The *Manual* of Mr. Jenyns, to which we finally and gladly revert, is, with a few trivial exceptions, all that the student of British zoology can wish for, or require, in an elementary and synoptical work,—clear, luminous, minute, and, in general, extraordinarily accurate. We congratulate the reverend gentleman on the ability which he has so conspicuously exhibited in the execution of his arduous undertaking. We congratulate the younger naturalists of our country, on the acquisition of such a guide in their zoological studies and researches. Greatly should we rejoice to see the remaining Classes of animals,—the *Invertebrata*,—of the British Islands, synoptically illustrated by a hand as masterly, and in a style as clear, unostentatious and unexpensive, as that of the Rev. Leonard Jenyns.

* We have, of late, been mightily amused by the freaks of a modern writer on "Mammalogy;" who, while arranging the Bats under the Order *Quadrumana*, has the modesty to stigmatize the *History of British Animals*, as a "wretched" production. Does he know how his favourite term *Mammalogy* is constructed; or what *Quadrumana* actually means? Has he deigned to peruse the really valuable work which he so unjustly decries?

[FROM THE FOREIGN SCIENTIFIC JOURNALS].

PROFESSOR MEISNER, of Basle, has recently given some account of the prodigious growth of incisor teeth, in some of the *Rodentia*, which he thus accounts for. These teeth, in their normal state, are continually growing in length, slowly rising in height from the alveola, in such proportions as become requisite to compensate for the daily wearing away of their chisel-formed edges. This growth not ceasing during life, he remarks that all such teeth are invariably tubular at their base; and that the same effect is produced not only in the incisor teeth, but in all others whose roots remain unclosed. In animals—such as the Elephant, Babiroussa, Hippopotamus, and Narwal,—where these bony productions serve as a defence, the same observation seems fully to apply; and they sometimes attain an enormous length, no given measure having been ascribed to them for the full period of their maturity, that depending solely upon the duration of the animal's life. In the molar teeth of Hares, Rabbits, the Beaver, and some other Rodents, this fact holds equally good; but it is not so in the domestic Rat, Mouse, and others, in which the alveola is always closed; he cites the observations of Blumenbach on the monstrous growth of the molar teeth of a Hare, examined by him, and also those of Rudolphi on a similar *lusus* in an Indian Pig. We have fully confirmed these observations by an examination of several extraordinary examples of this phenomenon in the matchless Museum of the College of Surgeons. In a Rabbit, we observed the incisor teeth to have grown in a spiral form: in a Hare, also, in which, from their position, they must have occasioned the animal's death, by entering the head, or pressing so firmly upon it, at either side, as to wound the flesh and penetrate it. It thus appears clear that a beautiful provision of Nature is exhibited in the formation of these teeth; their continual increase enables them to preserve a fine, even, cutting edge, always set to a particular angle with each other, so long as they remain truly in opposition; the motion of gnawing or cutting their food, having also the effect of keeping the teeth sharp, by means of their constantly slipping over each other. If, however, by any accident or malformation of parts, these teeth cease to act against each other, their growth still going on, they form a curved line, extending to an indefinite length during the animal's life, and occasioning no doubt, in many instances, premature disease and death. So perfect is Nature in all her mechanism, that the slightest deviation from it, by accident or other causes, produces fatal effects.



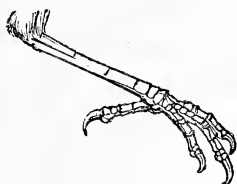


Ficedula Gorrula

FICEDULA - GARRULA.

ORDER.—INSESSORES.

FAMILY.—SYLVIADÆ.



WHITEBREASTED FAUVET.



BY EDWARD BLYTH, ESQ.*

As the Whitebreasted Fauvet—the Lesser Whitethroat of most of its describers—appears to be very little known, even to naturalists who have attempted to describe it, I shall endeavour to give a full account of its habits, as observed in a neighbourhood where it is rather a common bird than otherwise; and I have no doubt some of the readers of *The Naturalist* will recognize it as a regular summer visitant in localities where it has been hitherto unsuspected.

It arrives in Surrey about the middle, or towards the close, of April, though I remember to have once seen its nest, with three eggs, so early as the 23rd of that month; this, however, I consider to be a very unusual occurrence, as sometimes it is not heard here till the beginning of May. Its coming is always announced by its characteristic shrill, shivering cry, often delivered from the midst of some tall, thick, hawthorn hedge, or from amid the branches of an elm, especially if growing near a ditch. It appears partial to the vicinity of human abodes, and is particularly abundant about little hedge-bound cottage gardens, where its tiresome and monotonous, but lively, note is perpetually reiterated, and becomes irksome from its too frequent repetition. It abounds in most of the market gardens near London, and may be discovered even on commons, provided there are trees; but it is never found in open braky localities, or low hedges, where there are no trees—the proper habitat of its congener, the Whitethroated Fauvet (*F. cinerea*). In tall and leafy hedges, however, and in shrubberies, it occurs very commonly. The Whitebreasted Fauvet is the most lively and energetic of the British species, and the most restless when in motion. It is also of an extremely quarrelsome disposition, and will sometimes very fiercely attack and drive away a Whitethroat from the vicinity of its abode. The same pugnacity is displayed in a still greater degree in confinement, which renders it necessary to keep it alone, to prevent its worrying other birds to death, even though thrice its own size, and apparent strength. I have noticed in an aviary a bird of this species successively

* Communicated by Neville Wood, Esq., author of *British Song Birds*, &c.

drive away several of the larger *Fringillidæ*, the large Tit, and many others equally, to all appearance, its superiors in combat; but which were, nevertheless, quite unable to withstand the spirited attacks of the little Whitebreast. A very tame one, that was long in my possession, and which was often suffered to fly about the room, would frequently alight on the wires of a cage containing a Robin, and, on the latter approaching to defend his castle, the little termagant would fight fiercely with him through the wires, and soon compel him to retreat. Phrenologists may look for an ample development of combativeness in this little bird's cranium.

The characteristic activity of the Whitebreasted Fauvet is also very perceptible in confinement, and far exceeds that of any of its congeners. This beautiful little bird often assumes attitudes peculiarly calculated to shew itself to advantage;—throwing back its head, and at the same time partially expanding its wings and tail (the white exterior feathers of which then appearing conspicuous); in a moment it darts about with such rapidity that the eye can scarcely follow, or performs, in quick succession, rapid summersets in the air, throwing itself over backwards, and in a variety of fluttering and zig-zag ways. Then, perhaps, after a short time, it may be observed with the feathers of the crest and throat erected, and tail more or less raised, and often flirled, *check, check, checking* about, as is an occasional habit of all the Fauvets, more especially when they espy an enemy or object of distrust, which, in the wild state, they will thus follow for a considerable distance along the hedges.*

In the accompanying representation, I have endeavoured to delineate the bird in one of its characteristic attitudes, about to spring up into the air, and vacillate it knows not where; but such positions are, of course, only momentary.

The Whitebreasted Fauvet is of equally active habits in a state of nature, where, instead of dissipating its energy in the performance of summersets,† it may be seen, occasionally, fluttering, with strange irregular flight, from tree to tree, or winging a circuitous route across a field, ever and anon repeating its monotonous ditty as it flies; but it never rises singing into the air, or hovers warbling, as is observed in the Whitethroated Fauvet, or in the Dusky Furzelin (*Melizophilus fuscus*),‡ another species closely allied, though ranging in a separate minimum division. Indeed, its inward warble is rarely emitted on the wing, except immediately before it alights on a bough, as may be also noticed in the Blackcap and Garden Fauvets (*F. atricapilla* and *F. hortensis*), and in fact in numerous other small birds, all of which then continue the strain without stopping, after they have settled.

* All this I know from actual observation, having for many years paid especial attention to the highly interesting family of Warblers.—N. W.

† I have, however, noticed these summersets in wild individuals.—N. W.

‡ Dartford Warbler, of the books.

This inward warble of the Whitebreast is extremely pretty, cheerful, and lively, but very low, scarcely audible at a trifling distance. It consists of a variety of pleasing chirps, delivered continuously, in a warbling manner, and quite devoid of all that harshness which is too prevalent in the song of the Whitethroat. A note-like *sip, sip, sip*,* is often introduced, which will enable the young ornithologist at once to recognize it. This warble is often repeated for many minutes, almost without intermission; as is also the case with that of the Blackcap Fauvet, its more generally known congener. As in that charming songster, this warble commences, when in confinement, in spring, long before the loud notes are ever uttered, and it is similarly discontinued, by slow degrees, some time before the latter cease to be heard. As the Blackcap, too, almost invariably concludes with its loud and cheerful warble, so also does the Whitebreast mostly terminate with its loud, shrill, and monotonous shivering cry; which note not a little resembles the reiterated and tiresome chant of the Cirl Bunting. The louder songs of both the Blackcap and Whitebreast may be heard, though gradually less and less frequently, till the end of July.

The general habits of the wild Whitebreasted Fauvet approximate very closely to those of the Blackcap and Garden Fauvets, and it inhabits very nearly the same localities. Authors have described it to frequent exclusively the closest underwood; "on which account," says Selby, "specimens are only to be obtained with difficulty, and by patient watching." But it does not appear that this eminent ornithologist was personally much acquainted with the living bird, having, most probably, written from the imperfect description of some correspondent. In many parts of Surrey, where the species is extremely plentiful, it is as frequently observed in trees as the Garden Fauvet, and may be often seen, or rather heard (but, if watched for, may be seen also), at a considerable height from the ground. I have, indeed, more frequently noticed it near the summits of high trees than either of its British congeners, and have repeatedly shot it from such situations. Moreover, I cannot even admit that it is a particularly shy species; but, on the contrary, it is, from its restlessness, much more frequently visible, and therefore somewhat easier to procure, than either the Blackcap or Garden Fauvets. It may likewise be often seen resting, with its plumage puffed, perched conspicuously in the sunshine on some bare branch, where its snowy white breast renders it extremely noticeable.†

* Of course I am aware that consonants never occur in the notes of birds; at the same time, my purpose is sufficiently effected if some idea can be thus conveyed of the particular sound to which I allude, and this, I think, may be pretty correctly gleaned from the above attempt to spell it.

† I must here plead innocent of confounding, in this instance, the subject of the present memoir with the Grey Flycatcher (*Muscicapa grisola*), or the Grove Pettychaps (*Sylvia sibilans*), both of which may be often seen watching for passing insects in similar situations,

The nest is built in similar situations to that of the Blackcap Fauvet, but is less frequently placed in a fork; sometimes it occurs in herbage close to the ground, and not unfrequently in tall hawthorn or other bushes, at six, eight, or even ten feet from the surface, but four or five is more the usual average. In construction it somewhat resembles that of the Whitethroated species, but is smaller, and more compact, and is invariably more or less lined with small rootlets, which is its distinguishing character. The eggs, four or five in number, are smaller than those of its British congeners, greenish white, blotched and spotted—chiefly at the large end, where the markings often form a zone—with brown and dusky ash-colour, the prevalent tints throughout the genus. They are comparatively little liable to variation, and have the spots always larger, and the ground colour much clearer, than in those of the Whitethroated Fauvet. The specimens figured in the plate represent, very nearly, the extremes of variation. This species is also exceedingly shy of having any liberties taken with its cradle, which it will forsake on a very trifling occasion.

The Whitebreasted Fauvet rears at least two, and, I suspect, often three, broods in a season, as I know to be the case with the Whitethroat. The young

their white under parts shewing very conspicuously. So far as I have observed, none of the Fauvets have any idea of following an insect upon the wing, however expert they may be at capturing them the moment they come within their reach. I have many times, in a room, seen the Whitebreast eagerly watch the motions of flying insects, and snap at them with almost unerring aim (though sometimes two or three times in quick succession) the instant they ventured within the reach of its bill; but I never knew one to attempt to follow them into the air, as is a common habit with the Redstart and Pettychaps genera (*Phenicura*, and *Sylvia* as now limited). I observe, however, that Mr. Neville Wood, in his recently published work on *British Song Birds*, describes a habit of the Garden Fauvet (*F. hortensis*) which, he says, “does not appear to have been noticed by any preceding naturalist. And that is, its darting into the air to catch insects, in the same manner as the Flycatchers (*Muscicapa*), often taking its stand on a dahlia stake, watching for its prey; darting aloft with inconceivable rapidity, with its bill upwards, catching the fly with a loud snap of the bill, and immediately returning to its station, again and again to renew the same process, with similar success. Often as I have observed this interesting manœuvre, especially last summer, I do not remember a single instance in which it missed its prey.” To these observations are annexed one or two remarks, in order to prove that he had not confused the Garden Fauvet with the Grey Flycatcher, a species with which, he assures us, he is equally familiar. For my own part, though I would by no means be understood to cast a doubt upon the accuracy of Mr. Wood’s observations, still I cannot but observe that the habit he here mentions is at variance with the whole tenor of what I have hitherto noticed concerning the mode of taking insect-prey in this genus; all the members of which (I mean the British species) I have repeatedly seen to act precisely in the manner I have just detailed of *F. garrula*. I may add, also, that the individuals in which I have noticed this were not dull-spirited, broken-plumaged, victims of mal-treatment, but clean and perfect, lively and active, specimens, which the most scrutinizing eye could not have distinguished from wild birds.

are hatched after fourteen days' incubation, and in their nestling plumage nearly resemble the adult individuals, their feathers being, however, of looser texture, and the colour of the head and back more uniform. The upper parts are of a brownish-ash colour, darkest about the ear-coverts, (which contrasts strikingly with the pure snowy white of the throat), and relieved by a lighter tint around the edges of the tertiary wing-feathers, which, however, do not in the least incline to mahogany colour, as in the Whitethroat: all the under parts are also white, inclining to silvery on the breast and flanks: exterior feathers of the tail whitish; legs and feet dusky lead colour. The adults differ chiefly in the purer grey of the feathers on the head, and some of the males have a very faint tinge, or rather gloss, of blush, upon the breast, as is more observable in the male Whitethroat.* The hue of the iris, also, which is hazel in the younger individuals, becomes of a beautiful pure pearly-white as they advance in age. Specimens with white irides are, however, comparatively seldom met with.†

Altogether, this is a bird of different aspect from that of either of its British congeners, but is nearly allied to a continental species, called *Sylvia passerina* by M. Temminck, and also to another, the *S. subalpina* of the same author,‡ which combines the peculiar structure of the Whitebreasted Fauvet with the dark vinous colouring of the Dusky Furzelin. All these little birds (more particularly the last-mentioned) are rather more full-looking and puffy of feather about the head and throat than the Blackcap and other typical *Ficedula*; and in affinities, appear to be intermediate between those species with black crowns and party-coloured tails, (*F. sarda*, *melanocephala*, &c.), and that form to which the Whitethroated Fauvet of this country belongs, and the continental *F. conspicillata*; which latter group, again, is connected with the typical species (those with tails of a uniform colour, as our *F. atricapilla*, and *F. hortensis*), by the intervention of the European *F. orphea*, a species common enough in the south of France, and remarkable for nidificating in society.§ The dusky Furzelin is, in many respects, intermediate between the Whitethroated and Whitebreasted Fauvets, (the Greater and Lesser Whitethroats of authors); but, nevertheless, possesses other characters of sufficient

* I remember to have read, in the writings of some French Naturalist, who laboured to prove that birds of the same species are much brighter coloured as we proceed southward, that this faint tinge of rose-colour on the breast of the present species is much finer in specimens obtained from Africa. What can be more shallow than such an assertion? since the identical individuals which pass the summer in Europe, retire, after having undergone their autumnal moult, to Africa, to spend the winter, and return in the very same garb to their summer haunts!

† I have only seen two with the iris perfectly white, three or four with it partially so. Of the former, one was a male, the other a female.

‡ *Curruca leucopizon* of Mr. Gould. = *leucopogon*

§ At least, so says Temminck:—"Niche dans les buissons, souvent plusieurs en un même lieu," &c.

importance to warrant its being ranked as a separate division, undoubtedly subordinate, however, in station, to *Ficedula*, of which it is a modification. In make of bill, the species composing the small sub-group of which the Whitebreasted Fauvet is typical, are intermediate between the Blackcap and Whitethroated Fauvets, but approximate rather more to the former—their bills, in fact, differing chiefly from those of the Blackcap and Garden Fauvets in being somewhat more lengthened and attenuated. The Whitethroat's bill is more a miniature of that of the Black Thrush,* (each of which, be it remarked, are the *brake* birds of their respective genera), while this organ in the Blackcap Fauvet is more in accordance with those of the arboreal Thrushes, (the Blackcap being likewise a tree-frequenting bird). The Dusky Furzelin presents the Whitethroat's bill, only rather more elongated and slender, and in general habits, song, nidification,† and eggs, approaches very nearly to the last-mentioned species, while, in other respects it as closely resembles the Whitebreast. Another character of the Dusky Furzelin, in accordance with the Whitethroat section of the Fauvets, is the yellowish colour of the legs and feet, which in the other *Ficedula* are of a leaden hue. In all the Fauvets, however, the structure of the bill is very different from what we observe in the genera *Salicaria* and *Sylvia*, which many systematists still confound with *Ficedula*, comprehending all these, and, indeed, many others equally distinct, in their vast and incongruous genus *Sylvia*, now with propriety restricted by most modern systematists to a truly *sylvan* group, the different species of Pettychaps, often popularly confused under the one name of "Willow Wren." It may be added, that the different species of Fauvet, even before they have a feather, may be told from the other genera just alluded to, by the red colour of the interior of the mouth, which in *Sylvia* is yellow, and in *Salicaria* either yellow or orange.

The Whitebreasted Fauvet exhibits a habit, in confinement, in common with the Dusky Furzelin, which is not observable in any of its British congeners,—that of climbing up the wires of its cage by repeated springs; a trivial particular, no doubt, but which is quite worthy of notice in connexion with its other peculiarities, as tending, together with many similar accordances, to intimate its near affinity to the last-mentioned species.

This same scansorial propensity was likewise observed by White, of Selborne, who, in one of his letters to the Hon. Daines Barrington, observes, that "a rare, and, I think, a new, little bird frequents my garden, which I have reason to suspect is the Pettychaps, [Garden Fauvet is intended]: it is common in many parts of the kingdom. * * * This bird much resembles the Whitethroat,

* *Blackbird* of ordinary colloquy.

† In this particular differing entirely from *Malurus*, to which it has been approximated.

but has a more white, or rather silvery, breast and belly; is restless and active, like the Willow Wrens, [genus *Sylvia*, as now restricted], and hops from bough to bough, examining every part for food;* it also runs [or, I should rather say, hops] up the stems of the Crown Imperials, and putting its head into the bells of those flowers, sips the liquor which stands in the nectarium of each petal. Sometimes it feeds on the ground, like the Hedge Dunnock, by hopping about on the grass-plots and mown walks." I have myself observed this latter habit, on more than one occasion. The other Fauvets are hardly ever seen upon the ground.

I may mention, among other accordances, observable in the Whitebreasted Fauvet and Dusky Furzelin, that both of these little birds emit, on certain emotions, a very peculiar low rattling note, which I have heard from no other species. This is repeated sometimes many times in succession, and in confinement, is almost sure to be uttered if any one approach their cage at night with a candle. From trivial peculiarities, such as these, we may judge of the true affinities of species.

The food of the Whitebreasted Fauvet consists of insects and their larvæ, which it seeks for with much assiduity amid the foliage of trees and bushes. It is less eminently frugivorous than the Blackcap and Garden Fauvets, more so than the Whitethroated Fauvet. Its depredations, however, are chiefly confined to the smaller fruits,—cherries, raspberries, and currants; later in the season, it devours elderberries, apparently feeding almost exclusively upon them. It departs rather late, a few stragglers occasionally remaining till the first week in October; indeed, that figured in the plate was shot in the last week of the preceding month, and accordingly exhibits the bird just moulted, with its feathers somewhat more neatly finished at the edges, than in those specimens which are killed in spring.

Nearly all birds shed, in the course of the spring and summer, the extreme terminal edgings of their feathers, and this by a natural process; not by their gradually wearing away, as is the common opinion. Thus, the white spots which adorn, in winter, the tertiary wing feathers of the Garden Siskin,† (*Carduelis*

* It will be observed that this most accurate naturalist does not by any means here corroborate the accounts given by Selby, Mudie, Neville Wood, and others, of the hiding habits of this species, nor lead one in the least to infer that it is "exclusively an inhabitant of the closest underwood;" but that the general tenor of his observations entirely bears out, on the contrary, what I have been asserting. If it be worth while quoting corroborative testimony, the Hon. and Rev. W. Herbert, in one of his interesting annotations to White's *Selborne*, justly remarks, on this particular passage, that "this bird certainly was not the Pettychaps [Garden Fauvet], which has not the manners here described;" but that "the detail exactly answers to the Blue-grey, or Lesser Whitethroat." —p. 304.

† For uniformity sake, I thus term the "Goldfinch" of the books; which latter term is however applied, in Yorkshire, to the Yellow Bunting. Hence the necessity of a systematical nomenclature.

elegans), disappear in summer, as if they had been cut out by a pair of scissors.* In some future communication, I may perhaps be induced to treat more fully upon this subject.

It may be remarked, that this specimen, killed so late in the year, was by no means, as some would otherwise perhaps be inclined to suppose, a weakly young bird of a late hatch, too feeble to accompany its fellows at the time of their migration; but its quill-feathers having been changed, (as is intimated by one or two of them not having yet attained their development), sufficiently proves that it was not a bird of that year, as no member of the *dentirostral* sub-order of perching birds changes its wing-primaries at the first renovation of its clothing plumage.

In confinement, the Whitebreast is hardy and healthy, and may be kept on the food usually given to insectivorous birds, allowing it also, occasionally, a little fruit, and insect diet whenever practicable. It mostly recommences singing about January; but does not utter its loud note until about six weeks or two months afterwards.

As to its distribution over the British islands, I believe it to be much more general than is commonly imagined, but that it is often most unaccountably overlooked, as it was, for a long time, in the southern counties. Mr. Neville Wood finds it plentiful in Derbyshire, and Mr. Herbert in the vicinity of Spofforth, in Yorkshire; Mr. Rennie, who, to my certain knowledge, is well acquainted with the bird, speaks of having seen it in Ayrshire, and at Musselburgh Haugh, near Edinburgh. According to Temminck, it is diffused over the temperate parts of Europe and Asia, but does not spread farther to the north than Sweden, in which country Linneus also observed it; a fact which at least negatively corroborates the assertion that it also visits North Britain.

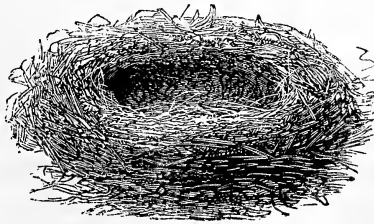
This bird is the "Lesser Whitethroat" of most ornithological writers, and is known in Surrey by the names *Nettlecreeper*, *Grey Whitethroat*, and *French Whitethroat*. Frequently, however, the first of these appellations is also applied by the peasantry, to the Whitethroated Fauvet, but whenever a distinction is made (which is more commonly the case with the nests and eggs), the latter is invariably the *Whitethroat*, and the other the *Nettlecreeper*. In Mr. Wood's recent work on *British Song Birds*, the subject of the present paper is called the "Garrulous Fauvet," though, strictly speaking, it is decidedly less *garrulous* than the Whitethroat. I have, therefore, preferred to designate it by the term *white-breasted*, which name is at least sufficiently exclusive among the British species.

That there should be a standard and a systematic vernacular nomenclature for our native productions, is, I think, very much to be desired. At the same time it is of little use altering unless we can improve. Every succeeding writer approximates more towards supplying this deficiency, and most of the aquatic birds

* This, however, only takes place very partially in confinement.

in Mr. Selby's meritorious *British Ornithology* are very aptly and euphoniously designated. Yet this author is often extremely careless about the names of his land birds, though he seems to prefer the appellation "warbler" for the Fauvet genus. For my own part, I much object to "warbler" as a generic name at all : firstly, from its having been so very extensively applied by writers in quite a technical sense ; and secondly, because it appears invidious to term exclusively any particular genus of song birds by an appellation of such very general import. When, however, we find such a non-exclusive term actually applied to birds that do not *warble*, and by those, too, who profess to reform the nomenclature, it becomes still more inapplicable. Who, for instance, can be expected to adopt the name "Hedge Warbler"* for a bird that neither *warbles* nor habitually frequents *hedges*? Yet such an appellation is proposed, by Mr. Neville Wood, for the *Sylvia loquax*, a species which might be aptly designated the *Dark-legged Pettychaps* ; a name which is not liable to any such objections. Surely we ought to discriminate between *improvement* and *alteration*, and allow no newly-coined names to pass muster which are so very obviously inappropriate. In scientific nomenclature, the Whitebreast has been variously denominated by different authors. It is the *Motacilla curruca*, and also the *M. dermatorum* of Linneus ; the *Curruca garrula* of Brisson and Selby ; the *C. sylviella* of Dr. Fleming ; it is the *Sylvia (Curruca) curruca* of Mr. Jenyns, the *S. curruca* of Latham and Temminck, and also the *S. dermatorum* of the former. Buffon calls it *La Fauvette Babillard*, and Temminck *Becfin babillard* ; *Babillard* is also Mr. Rennie's name for it, in Montagu's *Dictionary*. It is the *Klapper Grasmücke* of the German, Meyer, and the *Bianchetto* of the Italians. Its more popular name among the Germans signifies "Little Miller."

* A name, too, which is not in the slightest degree the less objectionable from its having been applied, by many writers, to the *Accentor modularis*.



ON THE DIFFERENCES BETWEEN VERTEBRATED AND INVERTEBRATED ANIMALS.

BY ROBERT MUDIE.

THE differences between the two grand divisions of the animal kingdom—those which have a vertebrated back-bone and internal skeleton on which all their organs of motion are inserted, and those which have no such skeleton, but have their organs of motion inserted in an external crust, or integument, of some description or other—offer many important lessons to the student of nature ; and, in as far as the mechanical action of the animals is concerned, they furnish a countless number of examples, the proper understanding of which is very essential in the mechanical arts. These are the two grand objects which we ought always to have in view when we study nature : because the first is at once the source and the gratification of mental inquiry, and the other enables us to turn our knowledge to practical use, in a world where the labours and the enjoyments of society must keep pace with each other.

But though the more solid parts which sustain the immediate organs of motion in the vertebrated animals are internal of those organs, and the sustaining parts in the invertebrated animals are external, it must not be supposed that the two grand divisions are reverses of each other ; for there are in the bodies of all animals many other structures than sustaining parts, and muscles to put those parts in motion, producing the external actions of the animal, varying according to the place which it occupies in the great system of nature.

There are four other essential systems possessed, in a greater or less degree, by animals of all kinds, though their general perfection or development, as it is called, and also their relative development in proportion to each other, are exceedingly varied in the different races. These four systems are, an assimilating system, a circulating system, a breathing system, and a nervous system ; which last is understood to be that upon which sensation, the grand characteristic of animals, depends, though upon this subject we cannot come to any very positive conclusion. The reason is, the animal cannot live without the joint action of all these systems ; and the dead animal, though it can shew us the anatomical structure, or number, form, and arrangement of the parts of the animal, can tell us nothing whatever about life. Hence we know life only as a phenomenon of the compound, and, consequently, we cannot refer it to any of the component parts separately from the rest.

We have countless instances of the effect of such unions when we examine compound substances, and the elements into which we can resolve them, or by the union of which we can reproduce them. Water, for instance, is exceedingly refreshing to animals and to plants, when applied to them in substance ; but nei-

ther the oxygen nor the hydrogen of which water is composed, nor the two applied together in mechanical mixture, as a gas, produce this effect in the slightest degree. Water also boils at 212° , and freezes at 32° , of the common thermometer, but neither of its two elements does this. As gases, the ultimate effect of boiling has passed upon them in bringing them to that state; and neither of them can be rendered solid, or even liquid, by any degree of cold with which we are acquainted. Innumerable instances, many of them far more striking than this, will occur to every one who has even a very slight acquaintance with chemistry, and also to any one who attends to the difference between the properties of mixtures, and those of the ingredients of which they are formed.

The conclusion here is altogether irresistible; namely, that we cannot attribute any one property or phenomenon, of a material compound, to any one ingredient of that compound, to the exclusion of the rest. It is in the fact of being compounded that all the properties of the compound originate, and when the compound is dissolved all those properties are at an end.

This illustration is taken from compounds which are not organized, and therefore it is not exactly in point as applied to animals. But still it is the foundation upon which our judgment of animals must rest, and, consequently, we must admit into the organized and more complicated compound nothing which is inconsistent with it. In every part of its system the animal is matter, and therefore it must obey the laws of matter, in so far as those laws are not controlled by the power of organization in the animal; which is the fact of animal composition, and not a substance which could by possibility have a separate existence, or an existence in any other species of animal, or even in any other individual, than merely the one which was the immediate subject of the inquiry.

Such being the case, we must be very careful, and not dogmatically attribute any function to any one structure of an animal, or even to any one organ, how necessary so ever that organ may be to the exercise of the function. Thus, for instance, an eye is absolutely necessary to the function of vision; but still it would be most unphilosophical to say that an eye sees; because, if such were the case, a dead eye, if in perfect preservation, ought to see as well as a living one. The very same argument applies to every organ in all the other systems. Nothing is more common, for instance, than the belief that animals perceive, and are impelled to act, by the brain; and there are not a few who assign different impulses to different parts of this organ: but were this the case, an uninjured brain, separated from the rest of the animal, ought to be as "cognitive" and "volontative" as ever.

But to leave this preliminary caution, which is a most essential one, especially to young naturalists, let us return to the organic systems which, in their combination, make up the body of an animal, and observe how they are distributed in the two grand divisions of vertebrated and invertebrated—or skeletoned and skeleton-

less—animals. The three systems of assimilation or nutrition, circulation, and respiration, are intimately connected with each other—so much so, that they ought, perhaps, to be considered as parts of one compound system,—the vital system, or that by means of which the body of the animal is originally formed and maintained during the period of its life in the exercise of those functions which belong to its species. We need not mention that the first part of this compound system, in its organization, consists of the whole alimentary passage, together with the accessory parts which promote digestion, and those by which the assimilated food is conveyed to the blood; that the second consists of the circulating vessels, whether their contents be blood in the arterial or venous state, or any other circulating liquid; and that the third part consists of that apparatus by which the waste (in most cases apparently the surplus carbon) of the system is conveyed by means of air or water to the general mass of inorganic matter. In the greater number of animals, whether vertebrated or not, the alimentary, or assimilating, part of the system, is internal; the circulating part is, also, more or less distributed throughout the whole body; and the respiratory part is variously placed—being internal in the warm-blooded vertebrata, and in many invertebrated animals, but more or less external in others. The nervous system is very differently situated; though it is always internal in what may be considered as its most essential parts, and more or less ramified through the body in the others.

In all vertebrated animals, the nervous system is really the central part; for the brain and its spinal elongation, from which the nerves proceed to all parts of the body, are always lodged within the vertebral part of the skeleton. In them, too, the three parts of what we have described as the vital system, are internal as regards the whole mass of the body, but external as regards the spinal column. They proceed from the opening of the mouth, and are lodged in cavities of the chest and abdomen, suspended upon one side of the vertebral column, and correspondingly on the same side of it, in all the classes of the grand division; but though they are supported on the spine, they are never contained in the same cavity with its essential contents. Of the system of reproduction we do not speak, because this is connected with the succession of generations in the animal, and not with any one animal considered as an individual.

In animals of this grand division, therefore, the several parts of the more important systems are kept separate from each other, and each enjoys a different degree of protection from external injury, and even from injury by the working of the mechanical system. The central parts of the nervous system are wholly enclosed within the bones of the vertebral column, so that no external injury can happen to them, except from the fracture or dislocation of this column; and the processes or projections of the different vertebræ are so formed, that dislocation of the column is next to impossible, by any ordinary strain to which the animal can be subjected. The breathing apparatus, and the heart, or centre of

circulation, are also well protected, and kept separate from each other, and from the alimentary or assimilating system; so that no two of these can interfere with each other, unless by such an injury as would be fatal to the animal. Then, as the whole of them are within the mechanical system, none of them can receive any displacement by the natural action of that system. It is thus evident that, in such animals, the greatest care is taken both of the compound system which carries on the vital functions, and of that which is understood to be more immediately concerned in the function of sensation.

It is very different with invertebrated animals, in all their classes, which are far more numerous and varied than those of the vertebrated ones. The whole of their structures, vital, motive, and sensal, are lodged within the same cavity; and thus, if we except the motive one, which gains from the arrangement some mechanical advantages afterwards to be noticed, they cannot have the same freedom or action as in the vertebrated animals, which have them apart. Accordingly, the organs of assimilation, of respiration, and of circulation, are far less perfect than they are in the vertebrated animals. No single description can be made applicable to all the differences which are found among them; but it may, in general, be stated that there is much less distinctness in the stomach and its auxiliary organs, though this is probably the most important part of them, because every animal must receive matter for its growth, and also for its nourishment; consequently, this part is the most complete. In the circulation there is no distinct heart, for, in many of them at least, the assimilated blood goes directly to the growth or nourishment of the parts; and they are provided with a sort of breathing tubes generally distributed through the cavity of the body, which perform the necessary process of aëration upon the nourishing fluid in its progress to the different parts. The system of sensation is, however, the least perfectly developed of the whole. There is not, in any invertebrated animal, any organ which can be positively said to be a true brain; and, generally speaking, the central parts of the nervous system are placed near the system of nourishment, the most conspicuous ganglion, or enlargement, being situated on the gullet, and the others in the continuation of the cavity of the body. In the orders which are most humble in their organization, the radiata, there are no symmetrical organs, the counterparts of each other upon opposite sides, as we find in all vertebrated animals, and in the higher orders of the invertebrated ones. The whole proceeds, as it were, from a centre, and, in very many instances, almost any point is capable of becoming a centre; for if the body is divided, the parts, in time, become entire animals.

It should seem, therefore, that the invertebrated animals are founded upon the system of assimilation, or nourishment, and that their predominant function is that of growth. They all do, indeed, possess sensation in some degree or other, higher in one class, and lower in another; but this part of their general system is always very inferior in its structure, and very subordinate in its power, to the

nourishing and growing portion. Many of them, indeed, have curious instincts, and perform labours in which a great deal of what we would call ingenuity, if they were the results of contrivance, is displayed. The cells of the bee, the webs of the spiders, the nests and covert-ways of the white ants, and a countless number of others, might be mentioned in proof of this ; but the animals which perform those curious labours display no more sagacity and resource than the humblest of the whole. The bee or the spider, for example, does not display more sagacity than the common earthworm, which is, perhaps, the most sentient of the three ; and yet it has no visible organs of localized senses. This, by the way, is a pretty convincing proof that sensation is the result of the organization taken generally, and not of any particular part of it ; though there is no doubt that any particular modification of sense must be acute in proportion to the perfection of its organ.

The vertebrated animals are as evidently founded upon the nervous system. It is the first organic portion which can be traced in the embryo when little else than a gelatinous mass ; and in that part of it which may be considered as central, and as such productive of the nervous energy, it is everywhere so fenced in and protected by bones, as that none of the other systems, and more especially the mechanical system, can in the least interfere with it. In the invertebrated animals the case is very different ; the nervous system is, in its central and essential parts, mixed up both with the vital and the mechanical system, and it is subservient to them. We can easily understand from the structure of man and of the higher orders of vertebrated animals, that the nervous system, in order to work to the full degree of perfection of which it is susceptible, must work perfectly alone and undisturbed ; and though it is impossible for us to say what specific effect this system has on the ultimate action of the animal as a whole, yet as that is always superior in proportion as the nervous system is developed, we must conclude that this system is a most essential part. Another opportunity will be afforded in a future number of *The Naturalist*, for investigating the curious connexion which there appears to be between the nervous energy of animals and that general energy of matter, whether organized or not, which is known by the several names of caloric, electricity, and galvanism, and conversely by the name of magnetism. But we may, in the mean time, remark that those animals and parts of animals which are capable of the most powerful action, how brief soever may be its duration, are also the most susceptible to electric excitement.

This protection afforded to the centre of the nervous system in the vertebrated animals, is obtained at some sacrifice of effect in proportion to exertion in the mechanical system ; and the sacrifice is always the greater the more that the nervous system is developed and protected. It is greater in mammalia than in birds ; greater in birds than in reptiles ; and greater in reptiles than in fishes : and it is greatest of all in the cartilaginous fishes, which, though superior to common fishes

in some of the humbler parts of their organization, are very inferior in vertebra-tion and nervous energy.

But while the absolute effect of the muscles or mechanical organs of the more highly developed animals is less, upon the whole, than that of the lower, there are counterbalancing advantages ; for the internal skeleton is, if we may be allowed the term, much more disposable, that is, capable of much more varied action in a single articulation, than the external crust. We may take the *Crustacea* and *Arachnida*, of which the common crab and the garden spider may be taken as types, as expressive of the highest mechanical structure of invertebrated animals ; and we may take the human body, in consequence of the universality of its application, as the most characteristic of the vertebrated ones. In these, if any one examines the pincer-claw of the crab in the articulations of its crust, and the skeleton of the human arm in the articulations of the bones, he will not fail to be struck at the very limited range of motion which the former possesses to that possessed by the latter. In the claw, the hard parts which are moved are external of the muscles which move them ; and, therefore, if there is an articulation of one part of the crust upon another, there must be two centres, and an axis of motion passing through those centres. But two points determine, and fix the position of a line, so that it cannot by possibility vary, if the points themselves are fixed ; as, for instance, a line on the earth's surface, passing through a fixed point at Birmingham and another at London, would be determined until it girded the earth as a great circle, and could not by possibility deviate a single inch to the right hand or to the left, even at the remotest distance from those two fixed points. The two centres of motion in the articulation of the crusted animal are two fixed points in the crust ; and therefore the axis of motion, which must pass through them, can have no angular play, and the motion must be confined to one plane, from which it cannot deviate a single hair's breadth. Such a joint must act with the most perfect precision ; and it will be found that in all the hinge joints of the crab's claw there is not the least lateral motion. If, therefore, the limb of an invertebrated animal is jointed by crust articulated upon crust, a great number of joints is required, in order to produce even a very limited variety of motion ; and no number of joints could produce the variety which the articulations of the human arm can communicate to the point of the finger. A more varied motion is obtained, by uniting the extremities of the two pieces of crust by a certain portion of cartilaginous matter, as we find in those joints which unite the crab's claw to the body of the animal, and also in the joints of the smaller claws, or walking legs. This mode of union, for it is not strictly an articulation, allows of bending in any direction, in proportion to the extent and flexibility of the cartilage that joins the two portions of crust. This, however, has a limit, and a very narrow one, because a very little extent or increased flexibility of the cartilage would render the limb so feeble and unsteady that it would not be efficient for any one purpose. Any

one who reflects upon the subject, and chooses to examine the specimen to which we have referred, will see at once that the range of action in the moving parts of an animal having the muscles inserted in an external crust or integument must be exceedingly limited; and that, in order to produce even a fraction of the different motions of which an animal with an internal skeleton is capable, there must be a much greater number both of articulations and of muscles. Accordingly, we find that the muscles of a caterpillar exceed by hundreds the muscles of a greyhound or an eagle; and yet its motions are mere crawling as compared with theirs, and its body is a thing of no weight in comparison.

In the human arm, or in any other limb having internal bones, the motion of a single joint may command a good deal more than an entire hemisphere, having the length of the articulated bone for its radius. This can be done in consequence of the real centre of motion in the joint of two internal bones being a point, which is equally affected to every plane passing through it, and, therefore, not tied down to any straight line crossing the direction of the articulated bones when they are straight. It is true that we never have in the body of any vertebrated animal this extreme variety of motion of which the joint of such an animal could be made capable; because, joints being made for purposes, must, from the very nature of the case, have motion in the direction of their purpose, and a fulcrum or support for that motion in the opposite direction. This, however, does not affect the perfect universality of the principle; and as motion on a single point, as a centre, is not affected by, or confined to, one direction more than another, there is an unlimited basis to the motions of vertebrated animals; and thus a joint can be formed capable of having its best motion in any direction that can be imagined. When several such joints are combined, the result is such as would stagger the belief of even those who are conversant with common mechanics, if they have not thought upon this very subject. Say that the human arm is, for instance, two feet in length, (making a little allowance for flexion in some positions), and that it can command three-fourths of a sphere of two feet radius, which is within the truth, the human finger can, as told to the microscope, divide this space to the two-thousandth part of an inch every way; and as it must pass from one of these very proximate points to the other, it may absolutely be said to divide this space to infinitude—that is, to a degree of minuteness which we cannot express by numbers, and of which, in fact, we can have no conception. Add to this, the motion which the shoulder-joint can receive from the action of the rest of the body, and add to this the additional motion given by walking or running, or by the use of the feet generally—and the power of the finger in dividing space becomes an especial wonder, and should lead every one to employ, in the most useful manner, an instrument which has no parallel in the catalogue of material things. This subject is as long as it is instructive, and our limits are already exceeded; but we may resume it on some future occasion.

NOTICE OF CUTTINGS IN A DISTRICT OF THE LONDON AND BIRMINGHAM RAILWAY,

BETWEEN

CASTLE-THORP, NORTHAMPTONSHIRE, AND BLETCHLEY, BUCKINGHAMSHIRE.

BY THE REV. JOSIAH BULL, JUN., F.G.S.

DURING frequent visits to a portion of the London and Birmingham Railway, some facts have fallen under my observation which have induced me to draw up the following notice, although my acquaintance with geology is limited, and I have little opportunity of acquiring a practical knowledge of subjects connected with it. The opinions I entertain may, consequently, be incorrect, but facts cannot be useless, and I therefore willingly make a statement of them.

The line of railway between Bletchley and Castle-Thorp nearly traverses the breadth of the Oxford clay, or rather a stratum of clay, which has been regarded as constituting the widest part of that formation south of Huntingdon. There is certainly an uniformity in the character of this deposit, throughout its whole extent; but it by no means agrees with the ordinary features of the Oxford clay, nor even with that formation in its immediate neighbourhood. Its fossils are different, and many of them evidently extraneous. It presents, also, other appearances which shew that this deposit must have originated under circumstances of a totally different nature to those which were present during the deposition of that formation.

The first point at which my observations have commenced is Castle-Thorp, on the borders of Northamptonshire. At the time I visited this spot, there was a cutting of about eighteen feet in depth through the deposit to which I have alluded, and the nature of which I shall presently describe. There was also a section, of a similar character, about half a mile from this, upon the south side of the hill. The line immediately proceeds across the valley of the Ouse, where a large viaduct is erecting. Beyond this point, at the north side of the valley, is a cutting of considerable depth, through horizontal strata of gravelly sand and clay, and boulders of limestone. Here also occur, in a horizontal position, large, flat, tabular masses of limestone, having a yellowish brown exterior, and being blue within. A little farther on, the same limestone occurs in a large mass, forming a stratum, which dips at a small angle towards the north. This limestone is covered by a clay similar to that at Thorp. Beyond this hill is the valley of Bradwell Abbey, and the ground rises again towards the village of Loughton. Here is a very fine section opposite the church at Loughton, the depth of which will not be less than forty feet, when the summit of the hill is reached. The depth, at present, is about twenty-eight feet through the same bed of clay; and I

am informed by the engineer of the works that the deposit presents a similar character at Bletchley, distant three miles from Loughton, and seven from Thorp.

I have spoken of a bed of clay which prevails throughout the whole line, with the exception of one point, the acclivity to the south of the valley of the Ouse, where it is less clearly defined. Now this stratum, although it occurs in what is denominated the Oxford-clay formation, presents characters which clearly prove that it has no connection with that deposit. It generally presents an uniform appearance, being a hard, dry *clay*, of a very dark blue colour, occasionally breaking down in very large masses. Nodules of chalk, from the size of a pin's head to two or three inches in diameter, occur in great numbers, pretty regularly distributed throughout it. These are always rounded and smooth, and numerous flints are associated with them. The most interesting fact, however, is the number and variety of the fossils found in this deposit. These consist principally of *Ammonites*, of at least from fifteen to twenty species; numerous specimens of *Gryphæa dilitata* and *incurva*, especially the former; *Belemnites*, portions of *Pentacrinites*, several kinds of *Terebratula*, and specimens of *Ostrea* and *Serpula*. I have one specimen of *Echinus*, which is filled with chalk, and, though very much worn, exactly retains the appearance of the chalk fossils. Many of the fossils are, indeed, worn, others are broken; the fragments of *Ammonites* are particularly numerous, and are often covered with indurated clay, or limestone, which has been worn round and smooth by the action of water. Beds of sand and gravel frequently occur through the deposit, and in them are found numerous small specimens of *Ammonites* and univalve shells, most of which are composed of iron pyrites. A few saurian vertebræ have also been discovered.

Now it is very evident that this deposit has little in common with the Oxford clay, although traversing the whole breadth of the formation so designated; for, in addition to the peculiar fossils of that deposit, we here find those of the Chalk, Lias, and Oolites. The fossils of the Oxford clay, it is well known, are frequently much compressed, and, when they are of a delicate structure, preserved with difficulty. This is especially the case with the *Ammonites*. Of these, as also of *Gryphæa dilitata*, (a characteristic shell), I have several specimens from Newport Pagnel, four miles east of the railway, and from Willan, one mile to the south of Newport, where the deposit bears the true character of the Oxford clay. Here, also, I have found very beautiful remains of the *Ichthyosaurus*. The fossils, however, in this formation, are generally very few: in this respect forming a striking contrast to those discovered in the railway cuttings.

Without offering any theory upon the subject, there is abundant evidence for the following conclusions. That, although supposed to form a part of the Oxford clay, the formation I have attempted to describe is of a totally different character; that it is posterior in its deposition to the Chalk formation; and that its fossils have been brought from a distance: and from all the circumstances of the case, it seems to be undoubtedly a deposit of diluvial origin.

Before bringing this notice to a conclusion, I ought not to omit mentioning the occurrence of some interesting vegetable remains which have been found in the Limestone which I described as forming a stratum to the south of the vale of the Ouse. In connection with large specimens of Lignite, are beautiful Ferns and coniferous plants. There are many cones in excellent preservation, imbedded in the limestone, all of which are about the size of a Brazil nut. The limestone is very similar in its character to that of the Forest Marble. It contains but a small number of shells, among which are the genera, *Terebratula*, *Mytilus*, &c.

It is unfortunate for geological inquiry, that the sections to which reference has been made, and others of a similar kind, are so soon hidden from observation. It has, of course, been an object with me to obtain as many specimens as possible of the fossils and of the beds in which they occur; and by these I shall be able at any time to confirm the statements I have made. In conclusion, I may be allowed to say that I shall sincerely rejoice if these brief observations may stimulate the inquiry and elicit the opinion of those who are far more competent judges of the subject than I can pretend to be.*

Newport Pagnel, March 14, 1836.

List of Fossils from the London and Birmingham Railway, chiefly from the Parish of Loughton, Bucks :

Ammonites biplex, (with perfect termination)	Ammonites Harveyi
A. communis	A. Gulielmii
A. triplicatus	A. Humphresianus
A. serratus	A. Lamberti
A. excavatus	(With three others not figured)
A. spinosus	Nautilus lineatus
A. omphaloides	Belemnites vulgaris
A. contractus	B. crassus
A. Turneri	B. minimus
A. Duncani	B. gracilis
	Cidaris ——— ?

* The above interesting communication was forwarded to us a few months since; and we sincerely hope that its publication may induce some competent geologist to undertake an examination of the singular deposit which Mr. Bull has described. Mr. W. H. Inwood, the architect, a zealous collector of fossils, has visited the localities alluded to by Mr. Bull, and we have had an opportunity of examining, at his residence in Euston Square, the specimens obtained by him at the railroad. We were particularly struck with the great variety and beautiful preservation of the *Ammonites*. The fossil cones are particularly interesting, and occur in a limestone apparently belonging to some member of the oolitic group.—Ed.

Spatangus — ?

Modiola elegans

Modiola — ?

Cerithium — ?

Lucina — ?

Unio Listeri

U. — ?

Pectunculus sublavus

P. — ?

Plagiostoma — ?

Nucula ovum

N. — ?

Pecten lens

Pecten — ?

Terebratula tetrahedra

T. trilineata

T. — ?

T. — ?

Serpula — ?

Gryphæa incurva

G. obliquata

G. dilatata

G. bullata

Madrepora turbinata

Pentacrinites — ?

EXPERIMENT ON THE NEST OF A BLACKCAPT FAUVET, (FICEDULA ATRICAPILLA).

THE shy and jealous nature of this species during the period of incubation, is well known to almost every tyro in ornithology. Touching the nest, or even looking at it, before the eggs are laid, almost invariably causes the birds to desert. The following, however, is a curious deviation from this general rule :—On the 6th of July, I found a Blackcap Fauvet's nest, without eggs. On the 8th it contained two eggs, which were warm. I then put a bit of light rotten wood into the nest, about the size of one of the eggs. This had been thrown out on the 10th, and a third egg was laid. I now inserted a small piece of hard mould, and took out one of the eggs; this was ejected the same day, and a few days afterwards I added to the two remaining eggs a pebble, equal in size to one of the eggs, and somewhat resembling them in shape and colour. Whether this proved too heavy for the birds to move, or whether it was not distinguished from the eggs themselves, I had no means of determining; but it was never removed. The young birds, two in number, were hatched on the 20th. Another remarkable circumstance, is, that the female should only have laid *three* eggs, *five* being the usual number; and even more than five might reasonably have been expected, as birds will frequently continue laying considerably more than the ordinary quantum of eggs, if one or more of these be removed before incubation has commenced.

The nest which furnished the above interesting experiments, was situated at the extremity of the branch of a yew tree, in a thick grove—a most unusual locality for this bird, and one in which I never before met with it. I have, however, lately heard of another similar instance, communicated by a scientific friend residing in the south of England.

N. W.

ADAPTATION OF FISHES TO DEPTHS OF WATER.

FEW departments of natural history are more interesting, both in a philosophical and in an economical point of view, than the natural history of fishes. They live in an element which, exclusive of lakes and rivers, covers seven tenths of the surface of our globe; and they inhabit that element, not merely in the breadth of its surface, as mammalia inhabit the land, but they inhabit it to the depth of a considerable number of fathoms. In consequence of this great breadth and depth of their pasture, as compared with the pasture of land animals, their numbers, and their powers of keeping up those numbers, are correspondingly great. The shoals of some of the surface fishes, and also of some of the ground ones—as, for instance, the common Herring and the Cod,—are numerous beyond all the powers of arithmetic; and their fertility corresponds, for a single individual of the Cod produces four millions at a birth, and there are many other species scarcely less productive; while land animals, whether mammalia or birds, are reckoned exceedingly prolific if they average a dozen, and some of the more important and highly developed races have very rarely indeed more than one.

This vast abundance of the finny tribes and the extensive means of keeping up their succession, not only in the individual race, but that the one may supply food for the support of the others, give them a great deal of interest in a philosophical point of view, by showing us how much we are mistaken when we suppose that the waters are the waste places of our globe. There is another consideration: we do not need, generally speaking, to cultivate the waters as we cultivate the land; or to breed fishes as we breed land animals. It is true that fresh-water fishes, and in some instances salt-water ones also, are bred for domestic purposes; but this is done more for the gratification of luxury than for economical purposes.

We need hardly mention that, besides the cartilaginous fishes, which approximate some of the reptiles in some points of their physiology, there are two distinct divisions of true or bony fishes, distinguished from each other by the characters of their fins, or swimming organs. These are *acanthopterygii*, or fishes which have the rays of the fins in one continuous piece, more or less flexible, but sometimes an absolute spine of bone; and *malacopterygii*, or fishes which have the rays of the fins jointed, and, generally speaking, of a less bony consistency than those in the others.

Both of these grand divisions inhabit, in their different genera, different depths of the sea; but it may be said, that, taking them on the whole, the fishes with spinous rays are the most discursive through the waters, and inhabit nearest the surface. Those with jointed rays to the fins are more divisible according to the grades of depths which they occupy; and these grades follow pretty closely the arrangement of the fins on the under part of the body. In considering the mechanical action of a fish, it is distinctly to be understood that the tail is the

grand organ of motion, and that the muscles which form by far the greater part of the bulk of the animal, are so inserted upon the processes of the vertebral column as to give to this organ of swimming the greatest energy which it can possess consistently with the bulk of the animal. But the tail of a fish has no motion except lateral motion, that is striking right and left in the direction of a plane, which, in the majority of fishes, passes equally through the centre of the back and the centre of the belly; and this, though it gives motion, and in many instances very rapid motion, has no power of ascent or descent in it, because it can strike the water neither downwards nor upwards; and it is by striking the water in one direction, that the body of a fish, or any substance immersed in the water, is impelled in the opposite direction. The direction of the course of fishes thus depends chiefly upon the action of those fins on the under part of the body, which answer to the four extremities in the mammalia; and those which have only two such fins—and for that reason are called *apodal*, or footless—have lengthened bodies, and partly direct their motions—which are, generally speaking, much slower than those of other fishes—by the contrary flexures of the lengthened body, as may be observed in the Eels, which have no distinct and separate caudal fin, but have the dorsal and the anal continued over a great portion of their length, and meeting each other at the extremity, as one continuous fin.

In the majority of fishes, however, there are four fins on the under part, and the different place of the posterior pair, determines, in a great measure, the mode of swimming in the animal, and the depth at which it inhabits the water. There is, also, a form of the body correspondent to this position of the fins, and to the depth of water at which the fish in general inhabits. If it is a surface fish, the body is, generally speaking, compressed in its lateral diameter, and the head is rather small, so that the centre of gravity falls nearly in the middle of the length, or rather midway between the anterior and the posterior fins on the under part, or, as they are called, the pectoral and ventral fins. A fish formed in this manner, is adapted more for straight forward motion than for rapid ascent and descent; and such fishes are furnished with dorsal fins, which, as well as the anal fins, are generally produced in proportion as the body of the fish is short and compressed according to its depth. Of this form we have examples in the Lancet fishes, and a number of others, many of which are vegetable feeders, living upon weeds; and others, again, feed upon the small animals which inhabit, in great numbers, the floating sea-weed which remains in the great eddies in the tropical seas. Such fishes, as they are not predatory upon any other fishes, are very often armed with powerful defences against the attacks of these. Those armatures consist of hard and sharp spines situated on various parts of the body—near the tail in the Lancet fishes, on the gill-lids in others, and in the dorsal fin, or in advance of it, in those fishes which inhabit the bottom of the waters, as in the Weever. In short, those defensive weapons are always so placed upon the body of the fish

that they may be used in the readiest manner in the direction from which an attack is likely to come. The attack on the Lancet fishes feeding on sea-weed, can hardly be made except in the rear, and thus they have their very sharp and powerful weapons upon the sides of the tail, not far from the origin of the caudal fin. The Weevers, again, and fishes of similar habit, which lie at the bottom of the shallows and feed there, have their defensive weapons in the dorsal fin, or sometimes on the head; and they repel their enemies by striking upwards with a violent rising motion of the body; whereas, the surface fishes strike laterally with the tail or the side of the head, according to the situation of their defensive weapons. It is not understood, however, that any one weapon of this kind with which a fish is armed upon any part of the body, is ever used for offensive purposes. Animals, in fact, whether they inhabit the land or the water, have never any weapons of mere warfare in the way of attack; their offensive weapons are given them for the purpose of obtaining their food; and when this purpose is accomplished, the animals repose, and are at peace with all the world.

Fishes whose habit it is to swim freely through the water without much ascending or descending, have always the posterior pair of fins on the under side, abdominal, or placed backwards; though many which have this form are ground fishes. It is to be understood, however, that this arrangement of the fins gives the fishes more command of the waters, in freedom of range, than those which have them differently situated. The Salmon may be taken as a common or abridged type of this form of fishes, and it is exceedingly discursive. The Herring also, and all the herring family have a similar arrangement of the fins; and they too are remarkable for the distance to which they can range. If ascent and descent are more the motions of the fish, the second pair of fins on the under part are placed forwards; sometimes immediately under the pectoral fins, and sometimes in advance of them. By this means the fish has great command over the head, in ascending or descending; and in such fishes the head is usually large in proportion, and the mass of the body concentrated on the fore part. The cod family are examples of this; and, though they differ a good deal from each other, they may be all considered as ground fishes, or opposite in their habits to the free swimmers, which have the second pair of their fins abdominal. Such fishes do not inhabit the shallows near the shore, but the banks and the surfaces of the rocks out at sea. They are exceedingly numerous in localities suited to them; and in point of numbers, and also in the lightness and wholesomeness of their flesh, they are among the most valuable tenants of the deep. The true fishes of the shallows, which keep and feed near the ground, are the flounder family, or flat fish as they are called; they are, perhaps, the least discursive of the fishes. There is a peculiarity in the structure of their spine which is possessed by no other animal. The vertebræ, of what may be considered as the neck, have a twist to the right hand in some of the genera, and to the left hand in others; so that the eyes

are always situated upon one side of the body, and not one on each side, as is the case with all other vertebrated animals. This twist of the cervical vertebræ throws the body on its side; and as the body is much compressed, it has the appearance of being broad and flat, whereas in reality it is thin and deep. In its action in the water, however, the body is always on the side; and the one side is like the belly of a common fish in the texture of its skin, and the other side like the back of an ordinary fish in the same respect. From this position of the body, the motions of the spine and caudal fin, in swimming, are up and down, and not right and left, as they are in the majority of fishes. The fins upon the two sides also, which may be considered as dorsal and anal, are similar to each other in size and form, and extend nearly the whole length of the body. The one of these fins is really on the back of the flat fish, and the other on the belly; but in the position in which the fish swims they are on the sides, as estimated in the greatest dimension across the body. Some of the fishes of this description have the fins on the under side formed into a disc or sucker, and others of them have a sucker upon the head, by means of which they can adhere to rocks, the bottoms of ships, and other solids. The eel family close the list, and though they do not inhabit the extreme depths of the ocean, they are more decidedly ground fishes than any of the others; and in cold countries they pass the winter buried in the mud, and in a dormant state.

R. M.

SCARCITY OF THE WALL SWIFT (*CYPSELUS MURARIUS*).

Mr. Waterton tells me he has not seen a single Swift in his neighbourhood (Walton Hall, near Wakefield) this year, and the Rev. W. T. Bree informs me that it is becoming much more scarce in some of the midland counties than it was formerly. In a letter dated October 31, 1835, Mr. B. observes—"I often hear the remark that 'we have fewer Swallows than usual;' may not this be owing to their wanton destruction? The Swifts, more especially, appear to me to be diminishing everywhere, to my no small regret, as they are charming creatures to my mind, and I love their harsh scream, perhaps, almost as well as the melody of the Brake Nightingale. I was forcibly struck with the comparative scarcity of these birds during a tour I made last May through various parts of Oxfordshire, Berkshire, Buckinghamshire, and Northamptonshire." Mr. Blyth also mentions the Swift having become of much less common occurrence of late years in Surrey. For my own part, I have found it extremely abundant in Derbyshire, and in the part of Yorkshire (Campsall Hall, near Doncaster) in which I now reside, during the present year.

NEVILLE WOOD.

POLLEN OF FLOWERS.

ON examining the flowers of a species of *Amaryllis* with the assistance of a microscope, I observed that its grains of pollen, which are elliptical, on being immersed in water, quickly assumed a spherical shape. On watching them, whilst under the microscope, until the water in which they were immersed had evaporated, I distinctly saw them gradually assume their original elliptical form. The length of the grains of pollen being twice their breadth, their external membranous coating must possess greater elasticity than could have been anticipated. I afterwards applied heat to the dry pollen as it remained on the object-glass of the microscope, till some of its grains contracted into irregular shapes. On being again immersed in water they still possessed elasticity, generally became spherical, but some bluntly elliptical. I then applied heat to them whilst immersed. This experiment indicated the existence of a single orifice in each grain, and also that they contained a portion of free air, the rarification and consequent escape of which occasioned a minute bubble to rise on each grain of pollen.

These facts, in themselves, are unimportant, but I have reason to believe that you desire both to communicate and elicit information ; and such facts may induce attention to the subject by some of your readers who are better qualified, and have more leisure, than myself. It may not be amiss just to hint at the *extent* of this field of inquiry. Gleichen, Brongniart, and others, have been travellers herein ; and we are told that numerous minute spherical granules have been discovered within each grain of pollen. The *Amaryllis* pollen which I examined may be considered as large sized, in comparison with that of the generality of flowers ; still I find that one hundred and eighty thousand of these, placed regularly in rows, would cover but a square inch. How inconceivably small must be the size of one individual of those minute granules, if they be numerous in such a grain of pollen as I have described ! The imagination endeavours, in vain, to trace out the comparative dimension of its untangible materiality. I wish *The Naturalist* all possible success, and I shall most probably trouble you with other facts, as they happen to come under my observation in this world of wonders ; a world, by the bye, which most of us are satisfied to travel through blindfolded.

Βησα.

ON THE HABITS OF THE COMMON COOT (*FULICA ATRA*, LINN.).

BY NEVILLE WOOD, ESQ.*

THE Common Coot belongs, according to the quinary system, as developed by Vigors, to the fourth order of birds, *Grallatores*, and to the fourth family, *Rallidæ*; an aberrant group, which has not as yet been divided into the five sub-families which it must contain, supposing the arrangement now followed by most of our eminent ornithologists to be a natural one. As zoological classification is, however, at present, confessedly in its infancy, it would be a waste of space and time to fatigue the readers of *The Naturalist* with further observations on this subject. The specific names, *common* and *atra*, are neither of them unobjectionable, but I am compelled to adopt them until better are proposed.

The habits of the Coot do not appear to have been very minutely studied by British naturalists, although so common a species in almost every part of the kingdom; indeed, its abundance would almost seem to be the cause of this neglect. Thus, few birds are more cursorily noticed in most ornithological works than the common House Sparrow, and yet, when we more closely examine its habits, we find them by no means destitute of interest.

The Coot is not particularly nice in the choice of its habitats, and is almost certain to be found in moist situations; it abounds, however, much more in some localities than in others, and in general prefers large, unsheltered sheets of water, of considerable depth, and where the weeds, rushes, &c., are not over luxuriant, to the smaller pools, surrounded by woods, and choked up with herbage, which is the typically favourite haunt of the Gallinule. The lake which passes through Foston, Derbyshire, is of the latter description, and while its surface literally swarms with Gallinules in the evening, scarce a Coot is to be seen; whilst in the beautiful sheet of water behind Sudbury Hall, only two miles from Foston, the Coot is extremely plentiful, and the Gallinule comparatively scarce. This lake, though by no means destitute of aquatic herbage, is perfectly open, and only a very small portion is bordered by trees. It is worthy of remark that the Coot is seldom or never seen in the sheltered situations; while, on the contrary, the Gallinule frequents the secluded spots, only venturing far from the covert towards the approach of night. Another remarkable difference in the habits of the Coot and the Gallinule is, that the former retires to rest at sunset, while the dusk of evening is one of the favourite times for the sports of the latter; and I have even seen several on the water, both summer and winter, many hours after it has become dark. In summer its shrill voice is sometimes heard at intervals throughout the night, as I have frequently observed when listening to the charming melody of the Brake Nightingale.

* Author of the *Ornithologist's Text Book, British Song Birds, &c.*

The Coot is not so often met with in wet ditches as the Gallinule, and the former is quite as aquatic as any of the duck family (*Anatidæ*). Indeed, so partial is it to the water, that, during the many years which I have observed its habits, I have rarely seen one on land, and then only for a short time; while the Gallinule is often found at a great distance from any water, on roads, near houses, &c. In districts where the Coot abounds, it may be seen in considerable numbers in all seasons, on the water during the whole day, either seeking its food on the surface of the lake, diving, half-diving, or lazily allowing itself to be wafted by the winds and waves on the surface of the pure element, with its head buried between its shoulders, in the manner of the Herons (*Ardea*) and other aquatic birds. During the March winds it generally remains in this sulky mood the entire day; and I have, at such times, frequently seen more than twenty floating and tossing about on the waves, having all the appearance of inanimate bodies but for an occasional dart at an insect or fish which had unwarily approached within their reach. At these stormy periods they are seldom seen to dive, which at other times they do expertly (although rather a clumsy half-diver); but no sooner do the winds subside and give place to the balmy air of April, than their aquatic sports commence in full vigour, and they may be observed frolicing on the water, diving beneath, and testifying their joy in a thousand different ways.

This species cannot be termed gregarious, for although from forty to fifty may frequent a single sheet of water, yet each individual keeps perfectly distinct throughout the autumn and winter, and even in the breeding season they are not very often found in pairs; this peculiarity has prevented my ascertaining the *exact* time at which they pair, which, however, usually takes place in March, though sometimes later, according as the seasons vary.

The nest is built in a bed of rushes or irises, in an open spot several feet from the land, and is never situated, like that of the Gallinule, in a thick tuft of herbage, with a view to concealment, but may be easily discovered at a considerable distance. Its composition does not differ from that of the Gallinule, but it is larger and flatter. The eggs are of a light chocolate colour, marked with thickly-set spots of brown and purple. Their usual number is seven or eight, but I have occasionally seen nine, and even ten. The first broods are hatched about the middle or towards the end of May, but there is a continual succession of broods through the month of June. My observations lead me to believe that the Coot has but one brood in the year; and if two broods are ever raised I should be inclined to consider it rather a rare occurrence. The young quit the nest immediately they are hatched, keeping close to their parents until they can manage for themselves; they remain in the immediate neighbourhood of the spot three or four days, sleeping in the nest at night, and then disappear. If you approach the newly-hatched brood in the day-time they all disperse, diving underneath the water, and rising to the surface under cover of the aquatic herbage, and are often con-

ducted to a place of safety by the male bird ; whilst the female remains about the nest, manifesting as much alarm at your presence as if her brood was actually there.

The young birds have a very grotesque appearance, with black bodies, red heads, and white bills ; with yellow down sticking to their heads and necks on first quitting the nest. When they are in danger the parents swim anxiously round the object of alarm, uttering low chucks, and sometimes a kind of bark ; in producing this latter note the beak is opened as wide as it will permit. The common call-note of the Coot is a loud, chucking, mournful note, which may at times be heard issuing from a dozen different parts of the lake. I have likewise known it emit a noise resembling that of a Fowl before laying.

In general the Coot is rather a shy bird, but in some places, as at Sudbury, they are extremely familiar ; and if you sit down near the edge of the water, and remain quiet a short time, they will swim up to reconnoitre you, without the slightest indications of alarm : and their peculiar habits and attitudes are then studied with ease. When swimming it never flirts up its tail, like the Gallinule, but moves its head backwards and forwards, often erecting the feathers of its whole body, and setting up its wings in the manner of the Swan. The Coot has a heavy body and short wings, and is, therefore, little adapted for flight. Whenever it attempts to rise into the air, which is but seldom, the feet are allowed to trail in the water, as if it were unwilling to leave its favourite element even for a moment. It always preens its feathers in the water, and occasionally tumbles over in this element in a most remarkable manner, and apparently with no other view than for its own amusement. When it has a nest to guard, it seems entirely to lose all shyness and fear of man, and is by no means easily driven off when sitting, and will even allow itself to be touched gently with a stick, but with true birdish wisdom endeavouring to cover its head. If the female is disturbed the male (which, at that season, remains "within call") immediately swims up, and becomes so bold as to approach within a few yards of where you are standing. On your leaving the place the male generally follows to a considerable distance, as if to attract your attention ; while the female slyly enters her nest on the other side of the patch of herbage in which it is situated. If she is again disturbed she quits her nest much less reluctantly than before ; but, however often she may be driven off in the course of a single day, I have never known her desert her charge, as so frequently happens with the Gallinule.

When the Coot leaves its nest it never covers the eggs ; and I have often been surprised that the eggs and young of this and other aquatic species are not more frequently plundered by the Water Rat, with which the aquatic plants abound, than appears to be the case ; but after many years close observation of these birds I have never discovered, with certainty, that they were molested by this quadruped. As the bird often quits its nest for a considerable time,

frequent opportunities are offered to the depredations of these animals; but as these favourable occasions seem to pass unheeded we may fairly conclude that the thievish propensities of which this animal is accused properly belong to another species, and one, possibly, of rarer occurrence. That the eggs and young of water birds are occasionally devoured by some four-footed animals is undeniable; and I have, probably, erroneously described these and other depredations as appertaining to the Water Rat, in the *British Song Birds*. I believe Mr. Blyth is of opinion that the Water Rat never feeds on any animal matter; and that gentleman has communicated to me some experiments which certainly go very far to prove his opinion. I hope the doubt and obscurity in which this point is involved will be satisfactorily cleared up in Mr. Bell's beautiful work on *British Quadrupeds*, now in the course of publication.

The food of the Coot consists of small fish, and various insects, slugs, &c., which it obtains either on the surface of the water, amongst the weeds at the sides of lakes and ponds, or by diving. I have occasionally seen it struggling for five minutes or more to devour an unusually large fish, but it never desists until its object is accomplished. I never tasted the flesh of this bird, but it is probably fishy and unpalatable; at all events its *smell* is by no means inviting.

The crown of the head and the bill are of an opaque white, and cause the bird to be conspicuous at a very considerable distance. The feathers of the head and neck are of a glossy black; those of the body dusky brown: in swimming the tail is usually higher than the head. In the neighbourhood of Campsall, seven miles to the north of Doncaster, both the Coot and Gallinule are comparatively rare; a circumstance for which I have not yet been able to account.

THE GREY WAGTAIL (*MOTACILLA CINEREA*) A SONG BIRD.

No author with whom I am acquainted makes any mention of the song of this bird, and in the *British Song Birds* it is stated that, "with regard to vocal powers, the Grey Wagtail has no claims on our attention." In this, however, I have since discovered that I was mistaken, having heard the song, for the first time, about a week ago, in a corn field. The Pied Wagtail is by no means a constant songster; the present species is, undoubtedly, even less so; and perhaps the Oatears (*Budytes*) have no song at all. The notes of this bird are pleasing, but cursory, and much resemble those of the Pied Wagtail.

N. W.

July 24, 1836.

CENSUS OF INSECTS.

DR. IMHOFF, of Basle, has made an estimate of the number of insects now known, and such as, in all probability, may yet be discovered. In the first instance, he establishes a comparison between the number of insects mentioned in different faunas—and particularly Stephens' *Catalogue of British Insects*—with the probable number of insects now known, or yet to be found, in Germany. The sum total of this comparison gives, according to Stephens, 9,791 for Great Britain, and for Germany, according to the Doctor, 14,000 species.

To arrive at a general result, Dr. Imhoff does not think it advisable to estimate the number of insects as compared with species of plants, but he has chosen reptiles, as a class of animals with which the comparison may more fairly be calculated. Admitting, therefore, that in Germany there exist thirty-five or forty species of reptiles, and on the surface of the globe 1,500, that is, nearly forty times the number of those in Germany, the application of this system of comparison would give for the insect tribes the number of 560,000, being 14,000 multiplied by 40; an amount considerably short of the probable number of insects inhabiting the world, since at least 2,500, or perhaps more, may be added to Stephens' *Catalogue*.

To this calculation we add those of some eminent entomologists, in order to prove, as far as analogous reasoning goes, that something approximating a probable reality may be inferred by taking a medium or averaged computation. Linneus, in his *Swedish Fauna*, 1761, described 1,700 species, and in the twelfth edition of the *Systema Naturæ* the entire number of these animals, including the Swedish and exotic species, he was then acquainted with, amounted to 3000. Since his time, however, and more particularly during the last half century, the study of entomology has received such an impetus, that Mr. Leay, in his *Horæ Entomologicæ*, states that there are certainly more than 100,000 annulose animals preserved in various cabinets, nearly synonymous with the Linnean insects.

Dr. Burmeister, whose census of insects is the most recent, takes his point of comparison with known plants, by which it will be seen that Dr. Imhoff's calculation produces a larger amount of insect creation, though we think even his numbers short of the reality. In Germany, Burmeister states there are about 6,000 plants, including *Cryptogamia*, and upwards of 12,000 insects; thus, if the proportion be a constant one, the number of insects known, according to the 60—70,000 described plants, will amount to 120—140,000 species; and if the generally received opinion of modern botanists is adopted, that only about a third of the collective species of plants is known, the number of species inhabiting the earth would amount to 360—420,000 species of insects.

The venerable Kirby, in his calculation of the number of insect species, assumes that there are, on an average, six species of insects to one phanerogamous

plant ; and considering that there may be 100,000 species of such plants in the world, the number of insects would amount to 600,000.

In the Royal Entomological Cabinet at Berlin, there are 28,000 species of Beetles ; and from the presumed superiority in point of extent of the coleopterous order, Burmeister assumes that the actually known amount of insect species, and their relative proportions of number, in the different orders, may thus be distributed in round figures :—

Coleoptera	36,000
Lepidoptera	12,000
Hymenoptera	12,000
Diptera	10,000
Hemiptera.....	4,000
Varia.....	4,000
	<hr/>
	78,000

Stephens, with his usual accuracy, establishes the following numbers of each of the Orders, as regards British species of insects : they must, however, be considerably increased by the addition of many minute *Hymenoptera* and *Diptera*, noticed since the publication of his *Catalogue*:—

Coleoptera	3,300
Lepidoptera.....	1,838
Hymenoptera	2,054
Diptera	1,671
Hemiptera	605
Varia	544
	<hr/>

British species 10,012

By a parity of reasoning on this distribution, it is manifest that the numerical strength of the orders is comparatively far greater than Burmeister calculates : we need only illustrate the two first, to arrive at a similar conclusion with regard to the others. Stephens makes the *Coleoptera* not quite twice the number of the *Lepidoptera*, while Burmeister makes the *Coleoptera* three times more numerous than the *Lepidoptera*.

That good christian and excellent naturalist, John Ray, (to whose memory the equally great Cuvier paid a tribute when he styled him “le premier véritable naturaliste pour le règne animal”), says, in his *Wisdom of God*,—with great caution, however, not to overstep the bounds of truth or the modesty of conjecture—“supposing, then, there be a thousand several sorts of insects in this island and the sea near it, if the same proportion holds between the insects, natives of England and those of the rest of the world, as doth between plants, domestic and exotic, (that is, I guess, decuple), the species of insects on the whole earth—land and

water—will amount to 10,000, and I do believe they rather exceed than fall short of this sum.” Having afterwards discovered a greater number of English moths and butterflies, he was induced to imagine the number of British insects might be increased to 2,000, making the total number of the insect creation on the globe’s surface 20,000—not so many as are now extant of one order in one collection, and only twice the number of British species in one catalogue, without the subsequent discoveries.

Thus, Ray *guessed* the total amount of insect tribes to be a quarter of those now actually known to entomologists of the present day; and this number is assumed to be less than an eighth of those supposed to exist in the world. From such facts it requires no extraordinary stretch of imagination to conceive what yet remains to be discovered in this reign of creation alone, without adding the boundless stars of Nature’s other works, of which, in some instances, we know but little more, and in others far less. The strides now rapidly making in the study of natural history must produce extraordinary results; but we need only adduce the present subject as an instance of how far mankind is distant from the point of general knowledge, even of such things as are tangible and meet the eye, without embracing a microscopic world of animated beings, not less important in their several functions and purposes, and probably far more numerous in all their classes.

C. D.

SOME ACCOUNT OF THE LEVEL OF HATFIELD CHASE.

BY THE REV. F. ORPEN MORRIS.

JOURNEYING from Doncaster in a north-easterly direction, an hour’s ride will bring you to the border of Lincolnshire, crossing which you will soon reach the village of Wroot. Even those who have never before been in Roger Wildrake’s “moist county of Lincoln,” at this extremity of it, will at once recognize its peculiar characteristics, although the traveller on the road from Doncaster will have been gradually prepared for the wild and dreary tract of country which will here meet his view. I have travelled much, both in England and Ireland, but never did I before behold so strange and anomalous a region. The naturalist will visit “the Level of Hatfield Chase” with a spirit of inquiry, at least such was my case, for I had heard so much of the mystery in which its history is involved that I embraced the first opportunity of accompanying a friend who had greatly excited my curiosity by his description of the country. The following observations from my inspection of this locality are chiefly intended with the view of obtaining further information or corroborating my suppositions on the subject. There are three

conclusions with respect to this singular district at which it will be necessary to arrive with me. *First*, that the whole of this extensive region has been (at what remote period I am unable to say) an extensive and tangled forest; *secondly*, that it has been completely covered by fresh water; *thirdly*, that it has been entirely inundated by the sea. The facts from which these conclusions are derived, and the manner in which I account for them, are as follow: *first*, that it has formerly been an extensive forest is evident, for everywhere you meet with roots of trees, and trunks, and branches; and you cannot dig below the surface to any depth without striking against them. I have no doubt that the village of Wroot derived its name from the roots of trees which surround it on every side; and it is also possible that our modern word *root* may formerly have been thus spelt.* It is probable the village was originally partly built with these roots, and even at the present day extensive fences are made of this material, both in the open fields and in the village. In the less cultivated fields (for the country has been partially enclosed some years) many trunks of trees project above the surface, while in some of the best tilled enclosures there are none at all apparent, in consequence of their having fallen under the axe of the husbandman. There is no entire tree remaining above the ground; the action of the wind and weather, and perhaps the necessities of the inhabitants, having long since destroyed every part, except the base, and such portions as are under ground. The air being excluded, many roots and parts of trunks are left uninjured, and indeed unaltered, save that they have become exceedingly dark, indeed almost black in colour, and are harder than any modern trees. They make excellent palings, and are sold as such at rather a high price, requiring no paint, either for appearance or preservation. The whole face of this county is intersected by dykes of different dimensions, crossing each other at right angles, at the interval of almost every field. Even with these drains, the whole surface has, in past years, been completely covered with water, occasionally for three and sometimes six weeks, to the entire destruction of the crops; but a steam engine has been erected for the purpose of emptying the dykes and remedying this evil. From the observations I made on inspecting the clearing out of one of these dykes, I am led to my second conclusion, namely, that the region has been, in past times, covered by fresh water, but whether this was prior to the inundation by the sea is more than I can, at present, determine. The men employed in clearing out this drain dug down to a depth of about eight feet below the surface, and two and a half feet below the *low water* level of the sea. At the greatest depth they find the roots or parts of the trunks of trees in an upright position, and exactly as they grew. There are some also, as previously mentioned, growing, or rather standing, nearer to the *present* surface, so that the ground must have been formerly undulating and uneven, to what height or depth we can only ascertain as

* *Root* is derived from the Swedish word *rot* and the Danish *roed*.—Ed.

far as has been dug down ; at the lowest depth, however, trunks or roots are found so close together as to justify my former supposition as to the thickness of the forest ; for whilst clearing out the dyke, the whole road was lined with the fragments of the trees thrown up. Oak is the prevailing kind of timber, but there are also other sorts whose species I cannot ascertain, though birch and alder are, I think, among them. With the trees, at even the lowest depth, are found, here and there, very many species of shells, not fossilized, but in a recent state ; and it is from many of these being land species that we must infer, as I have before observed, the inundation of the plain by some river ; *Helices*, and a great variety of other land shells, being found among them. If left on the bank as they are thrown up, the atmospheric influence soon destroys them ; but I have several preserved in my collection which are unlike any I have ever seen, and relative to which I should be glad to have the opinion of some more able conchologist. In other places nuts and acorns are dug up, from various depths, in a perfect state, though apt to crumble to pieces after two or three days exposure to the air. The present extremely level state of the surface has evidently been brought about by the action of water (probably when receding), filling up or smoothing down the inequalities which I have before shewn to have existed. The tide is still kept from floating the present surface of the country by embankments on the Trent, and even at low water it is still above the level where these sea-shells and nuts and acorns are found in deepening the dykes, which might probably be discovered even still lower, if the soil were cleared away to a sufficient depth.

It would appear, then, that the question must be asked, whether the sea has risen on the eastern coast, since the washing in of these shells ; and also whether it must not have *first* fallen to allow of the present surface (so much above the *former* deposit left by the sea) becoming high and dry ? It also requires some explanation to account for the great accumulation of soil, to the depth, as I have shewn, of at least *eight* feet, over every part of the plain ; although this is *partly* accounted for by the upper inequalities of surface filling up the hollows, when subjected to the washing of so great a body of water.

With regard to the former of these two suppositions, the sea has certainly, even of late years, made great inroads on this eastern coast, and some suppose that this is partially accounted for by its gradual rising above its accustomed level, independent of the crumbling nature of some of the cliffs, which leaves them an easy prey to the ceaseless dashing of the mighty ocean. With respect to these lands having been also formerly covered by the sea, this is abundantly evidenced by the numerous species of sea-shells, muscles, and other shells, with which they abound. Whether the anomaly of sea-shells being found by the excavators in some parts of the Levels at a similar depth to that at which, in other parts, they discover acorns and nuts, may be explained by supposing a slight inaccuracy of measurement, and that one or the other may lie in a stratum an inch or two more

elevated—(the mistake as to depth, if any, cannot be greater)—I have not, at present, the means of ascertaining.

There are various theories entertained with regard to this singular region; but the most reasonable supposition appears to be this: that, in the olden times, some vast stream must have flowed through these tracts; that its course, on some occasion, must have been impeded by an accumulation of fallen trees, (whether a sudden or a gradual accumulation it is now difficult to determine, though probably impetuously carried down by some storm and flood); its outlet being thus obstructed, the natural consequence was the overflowing of the low land in its vicinity; and the water was, in all probability, prevented from running off into the sea again by such low eminences as still exist and now are useful to keep out the tide in the Trent from forcing its way, in its turn, over the land inside. The deluge of this river probably remained for some considerable time, until, at length, some obstruction was removed from staying its onward course; and when it retired it left an accumulation of soil, such as a river will always bring down, upon the previously levelled surface which the action of the sea (*i. e.* on the supposition that the sea was the first invader) had already prepared for its reception. Whether it *was* the sea that prepared it thus, as I have supposed, for the overflowing of the river—or the overflowing of the river for the irruption of the sea—is more than I can take upon me to assert.

All the substratum of this tract is a very black and rich *looking* soil, and is no doubt an amalgamation of vegetable matter; but it, as well as the superjacent earth, is poor and unproductive; though, with plenty of manure, when well cultivated, it will produce a very fair average crop. Much of the wood below the surface has a thin coating of a bright indigo-blue colour. I am entirely at a loss even to guess as to what it can owe its formation.

The Level of Hatfield Chase, was first drained by a Dutchman, on the plan of the dykes used in the low countries of Holland for keeping out the sea. I have in my possession some bones of animals, which were dug out of one of these dykes, which I have not alluded to, doubting whether, though found at considerable depth underneath the slough, they might not have sunk gradually into it, having been cast in there at some comparatively recent period. One is a large thigh-bone, apparently of a horse; the other, I imagine, the skull of a deer. On inspecting the latter again rather more minutely, I discovered, in one of the orifices for the arteries, a beautifully perfect shell, nearly hidden in the hollow, but which I safely extricated in an entire state. This probably may, in some measure, corroborate the original supposition, as to their having been deposited coeval with the inundation of water. I will only add, that the word *Chase* signifies a forest, which is in favour of my first conclusion, that this tract formerly wore a similar appearance to Cranborne Chase, in Dorsetshire, and many others.

ON THE CULTIVATION OF NATURAL HISTORY.

MR. COQUAND, whose residence and scientific labours in the Pyrenees are so well known and so much admired, has opened a gratuitous course of lectures on Natural History, at the college of St. Bertrand, under the direction of Mr. Cabal. The ardour which his young pupils already begin to exhibit in collecting and learning the names of the different natural productions met with in their walks, and the emulation which this delightful pursuit imparts to all their other studies, sufficiently demonstrates the great utility to be derived from establishing, in every public or private seminary, similar elementary courses for young persons. But let the heads of these establishments carefully avoid the danger that may arise and frustrate all their best and most earnest intentions, if the professor to whom this instruction is confided does not avoid all theoretical considerations of method and of classification, which, at the outset, would inspire repugnance, disgust them from a study apparently surrounded with insurmountable difficulties, and make a laborious task of that which may be rendered a mental relaxation for the young or old. Let him, on the contrary, confine himself to instructing his pupils in the technical and common names of the objects they meet with—let him point out the strong indications nature always furnishes, more or less distinctly, of her own undeviating system—let him, so far as he can, at the same time furnish his scholars with the most familiar facts regarding the uses and applications of natural objects to domestic economy, the arts, &c. Let him point out, as a constant guide, the natural affinities of creation, so as to enable the young student to approximate and class together, from his own ideas, the genera and families of animated creation—let him describe the cheapest and simplest method of forming an infant *Hortus siccus*, of displaying and preserving the first capture in entomology, or arranging the pupil's geological specimens; and this study will soon present daily increasing charms, more fascinating, more varied, than any other of their juvenile pleasures: they will imperceptibly acquire that love of observation—of order—of research—and above all, when properly directed, that reverence of the great architect of nature—which will influence their future lives, affording them a source of consolation and mental enjoyment in the midst of the anxious cares of life, and their relative future positions in civilized society; it will also, at an early period of life, prevent the fatal consequences of idleness or ill-spent leisure, but too frequently, morally and physically, exhibited in large schools.

These remarks may not, probably, be considered novel; but why has no attention been paid to them? Eminent men concur in advising such a step. The system of present education fully sanctions the introduction of the study of Natural History, as being instructive to the youngest person; yet no measures are generally taken to promote it in our juvenile schools or colleges, where, if it is adopted, it is only recommended to pupils of a certain age, whose advance in learning has

already developed well-defined propensities, too late to be checked if bad ones, too confirmed to be guided into another channel, and most frequently derived from any other source than that every day presented by nature's inexhaustible storehouse. It is also true that, with boys somewhat advanced, they, to a certain extent, disdain the first principles of natural science, as only worthy their junior's attention: they would, as it were, acquire natural history *per saltum*, and begin where they should end, in forming or embracing a particular system. It is, therefore, with the younger classes that a study of this nature is most likely to produce beneficial results, a lasting moral impression, and obviate infallibly many vicious propensities or opinions so much to be deplored in youth, so difficult to correct in after years. The present time is most fruitful in elementary works for the instruction of youth, but they are all founded on subjects too difficult to acquire without making a labour of that which may be learned without fatigue in the book of nature; and there are always opportunities afforded to do so, without the study wearing the appearance of a task. It has been urged that, with children, some branches of Natural History could not be taught, as it involves a degree of cruelty incompatible with the benefit attempted to be imparted; and the child who, in infancy, could deliberately pin a butterfly to a piece of cork, might, at a more advanced age, feel disposed, with the same *sang froid*, to stab a fellow creature. Bad, indeed, must be the instruction that could lead to such a conclusion—to such a perversion of the first principles of humanity. Let every species of philosophical cruelty be avoided, as it readily may be; confine the pupil's study to such objects as present a vegetable existence, or are merely of inorganic formation, leaving to the result of time the peculiar taste that may arise for the investigation of other portions of creation, when the mind is capable of acquiring information at the smallest sacrifice of humanity, and when such knowledge may conduce to the general benefit of mankind rather than to the peculiar gratification of any one's individual taste.

C. D.

UNUSUAL LOCALITY FOR THE NEST OF THE COMMON GALLINULE (*GALLINULA CHLOROPUS*).

I HAVE seen the nest of this bird situated in the upper branches of a middle-sized Portugal laurel, overhanging the water, and at several feet from its surface. I had previously met with more than one instance where it was built in bushes, but never before at so considerable a height from the ground. It would have been interesting to have observed the manner in which the newly-fledged young were conveyed from the nest; but this, unfortunately, I had not an opportunity of doing.—N. W.

R E V I E W S .

Transactions of the Geological Society of Pennsylvania. Vol. I., Part 2.
Philadelphia : James Kay and Brother.

OUR brethren across the Atlantic, with that shrewdness and foresight which enters largely into their national character, are wisely anticipating the advantages which, as a flourishing commercial people, they will derive from an intimate acquaintance with the geological history of their own country. In many of the United States, geological surveys are going forward, encouraged by the immediate sanction, or even active co-operation of the legislature ; and judging from what has already been effected, the completion of these important undertakings will not be retarded by any lack of spirit and energy on the part of the government, or from a want of competency among those who have volunteered their services in the cause. Three or four years hence, and a considerable portion of the new world will be before us with its geological relations familiarly laid down in colours, or as minutely detailed in black and white, as are now (thanks to the industry and perseverance of British geologists) those of our own island.

There is something at first almost startling to the imagination, in contemplating a task so arduous as that of working out the geological features of the vast continent of North America. Difficult, however, as the attempt may appear, the undertaking is not one beset with insurmountable obstacles. The ground, it is true, may be untrodden, but he who ventures to explore it is not without a beacon to direct his steps. The American geologist has a course of investigation before him, in which the *modus operandi* is already determined. On entering the field of inquiry, a track that has been beaten elsewhere points out to him the line of research which he must adopt. The rocks in this country will be, as it were, the stepping-stones to the mountain-ranges in his own ; and while traversing the deep ravines and boundless plains of that extensive region, he will not be unmindful of the benefits conferred on science through the patient industry and unflinching zeal which animated Smith, or fail to appreciate the true spirit of philosophy which prompted the labours of Coneybeare or Greenhough.

The work now before us is the second part of the first volume of transactions, published by the Geological Society of Pennsylvania : a Society established in 1832, at that time consisting of only seven individuals, but which now enrolls on its list of supporters more than 200 resident or corresponding members.

It is with feelings of the most lively interest that we observe the name of our countryman, Richard Cowling Taylor, as one of the leading contributors to the present volume. Six years have now elapsed since this enterprising geologist

quitted England for America, carrying with him that indefatigable ardour in the promotion of scientific objects which, being united to the happiest qualifications for the services on which he was engaged, could hardly fail to rouse a spirit of philosophical research among those into whose society he might be thrown. The name of Featherstonehaugh is as well known for his enthusiasm in the cause of science, as for the possession of talents which enable him to exert that enthusiasm so powerfully in her behalf. He has been one of those most actively engaged in geological surveys in several of the States, and the result of some portion of his labours has been laid before the public at the express desire of the American government. The following passage is from the pen of Mr. F. He is describing the travertin deposited by the waters in the valley of Sweet Springs, Alleghany county, Virginia, and proceeds to relate a highly interesting phenomenon connected with them :—

“I was one day returning to my cabin with some specimens of this travertin, when I met Mr. Rogers, the landlord of the establishment at the Sweet Springs, an old inhabitant of this part of the country and a very intelligent and worthy person. He assured me that, some years ago, when hunting deer in the hills, he had seen some rocks exactly resembling them. As he is a man of very good judgment, I proposed to him to accompany me there, and he cheerfully consented. Mounting his horse and accompanied by myself on foot, we went about six miles in a north direction ; but so many years had elapsed since he had casually observed the place, and the deep dells and hills, clothed with their everlasting woods, resembled each other so much, that we passed an entire morning wandering about, climbing one hill and descending another, till I began to think he had been mistaken, and told him so ; but he proposed trying another hill side called Snake Run Mountain, and there I followed him. Being in advance of me, I heard him holloa, and I immediately knew that the game was found. He approached me holding in his hand a piece of very ancient travertin, which I recognized at once ; and leading me to the brow of a hill, *at least three hundred and fifty feet above the level of the Sweet Spring*, I saw, to my great surprise, a huge mural escarpement of travertin, skirting the brow of the hill, with the weather-worn remains of old stalactites ; whilst the body of the rock resembled, in every particular, the recent one at the cascade, abounding in large pipes of calcareous matter, which had formerly enclosed logs and branches of wood. The pendant stalactites consisted of concentric circles ; and there was the complete evidence that a stream of mineral water of great breadth, containing carbonate of lime, had, for a great length of time, passed over this brow, and formed the rock. The surface of the rock, in many parts, was interspersed with what are vulgarly called pot-holes, being circular perforations made in rocks by pieces of rock and gravel, kept whirling in them by streams of water similar to those which I have seen at the summit of the lofty hills of Lake George, in the State of New York. This Snake

Run Mountain stood, as I found by compass, N. N. E. by E. from the Sweet Springs; and Peter's Mountain, of which I could get a peep through the trees, bore east of the place where I stood.

"Here was an extraordinary phenomenon! an immense deposit of travertin, lying three hundred and fifty feet above the level of the spring from which it probably was derived. It seems to be susceptible of no other explanation than that the level of the valley was, at some remote period, much higher than it is now, and that the springs were, at least, at this level. The Snake Run Mountain is a large limestone outlier from Peter's Mountain, such as are constantly found in the valleys. Before these were scooped out by the retiring currents, it is probable that the whole surface of this now deeply-sulcated region was continuous, and that the springs issued from the bottom of the ocean. When the valleys were swept out, these knobs, hills, and spurs, being hard, compact, transition limestone, resisted, and were left; whilst the conglomerates, shales, and sandstones, were carried away: since that period the softer parts of the formations, occupying that part of the valley where the springs now are, have been gradually worn down, and a new direction given to the stream; whilst the old travertin remains a monument of the ancient level, and one of the strong geological proofs of the process of denudation."

A considerable portion of the communications now under consideration relate to subjects more or less connected with the mineral resources of some parts of the United States, and which, though of the highest importance, naturally possess a more local interest than other parts of the volume. The contributions relating to organic remains contain some new and valuable information; but the limits of our present article will not admit of extending our analysis to them, and we must therefore refer our readers for points connected with their history to the work itself.

There is certainly one subject upon which we cannot help expressing our regret, and that is, that the present volume should be so destitute of information upon the tertiary geology of America. With the exception of a short notice, by Mr. Conrad, upon a portion of the Atlantic tertiary region, we find no allusion whatever to the supra-cretaceous deposits, which are so largely developed in some parts of the United States. The important results which have attended the examination of the beds above the chalk in England and the adjoining continent; the wide field which has been opened for theoretical inquiry into the causes of phenomena which are there presented to us; and the connection existing between the newest rocks of this period and those deposits which are accumulating from the operation of agents now in activity, give a degree of interest to facts bearing upon the history of that epoch which does not attach itself to any other department of geological investigation.

We are not, it is true, entirely without sources of information upon the ter-

tiary formations in America. Mr. Rogers's report recently laid before the British Association for the Advancement of Science, gives a general outline of their extent, besides furnishing much valuable matter respecting them. No one, we presume, will dispute the talent and ability which he has displayed in the execution of the task, but he has performed it under a conviction of the soundness of *the new principle* in the arrangement of tertiary strata. He can infer, with precision, the exact comparative age of a deposit by comparing its fossil shells with existing species! If we may hazard an opinion with reference to this subject, it would be that the new principle, however beautiful in theory, or apparently simple in application, as it at present stands, is as much a stumbling-block on the one hand as it may be an assistance on the other. Mr. Conrad, it would appear, does not always see his way so clearly as could be wished in making out his formations upon the new system; the per centages do not always tell up exactly as they ought. At page 340 he observes, "I have rather too hastily supposed that the equivalent of Mr. Lyell's miocene period occurred in this country; but I am now convinced that all above the eocene may more properly be termed older and newer pliocene. There is no gradual transition from the older to the newer tertiary, but so vast has been the change in the period of time which elapsed between them that a single species of testacea has alone survived it; besides, so many recent species of the Atlantic coast of North America occur in every deposit of the tertiary above the eocene, that although the amount varies considerably in different localities, from fifteen to thirty per cent., yet I believe the discrepancy to have been caused by different depths of water, or peculiarity of situation, not difference of time in which the species existed. These remarks, however, do not apply to those deposits which are composed almost exclusively of existing species; they are certainly entitled to the appellation of newer pliocene, and occur chiefly in Maryland, North Carolina, and South Carolina."

We cannot help wishing that Mr. Conrad had been a little more explicit in his observation respecting the variation in the per centage of extinct fossil shells. As the passage now stands it is involved in considerable obscurity. Every one must be aware that in order to ascertain what proportion of fossil mollusca are identical with existing forms in any one deposit, the comparison is made with species from all depths and situations. The explanation given by Mr. Conrad is only applicable upon the supposition that the recent types to which the fossil ones are referred are exclusively littoral, or have all existed under similar physical conditions. Then, indeed, we might reasonably infer that, in our examination of a fossiliferous deposit, those localities would furnish us with the greatest number of recent species in which the conditions which formerly existed most closely resembled those from whence the living testacea had been obtained, and *vice versa*.

If Mr. Conrad can bring forward evidence proving that deposits of the same geological age exhibit a variation of fifteen per cent. in the number of extinct spe-

cies which they contain, he will undoubtedly have established a limit of error to that amount in the application of the new principle.

It may, perhaps, be urged that, in the present instance, no serious error could have arisen from the application of the new principle, because fifteen per cent. forms the maximum of variation; there being every intermediate degree from one to that number. This consideration, however, does not at all modify the bearing of Mr. Conrad's statement, with reference to the per centage test; because those localities which have furnished the intermediate proportions, and so connected the whole together, might have been destroyed by denudation, or might not have been accessible. Had this (which is by no means an unreasonable surmise) been the case, part of what Mr. Conrad now considers older pliocene would, under those circumstances, have been miocene.

We are rather surprised that Mr. Taylor should not have directed his attention to the tertiary formations in America. The *Transactions of the Geological Society of London*, and the pages of the *Philosophical Magazine*, bear ample proofs of the interest which he felt in those of England. It is true that, at Philadelphia, he is not exactly in the tertiary district; but fifty or a hundred miles are *nothing* in America, and even the *crag* at Bramerton, the favourite resort of cabinet collectors, will not bear competition with the bank of the Potomac.

We must not draw our observations to a close, without adverting to the valuable paper, by Dr. Harlan, on the remains of the *Basilosaurus*. As the description of this animal is before the public in another form,* we shall only allude to its prodigious length, which far exceeds that of any other saurian.

"We understand from Mr. Conrad, that he was informed by Mr. Creagh, that on his first settlement in that portion of the country, a train of vertebræ belonging to this animal was observed on the surface of this rock extending in a line much over 100 feet in length. This statement agrees with that made by Judge Bree; 150 feet in length being attributed by him to the Arkansa skeleton." —p. 350.

Had the *Basilosaurus* been discovered anywhere but in America, we should have thought the above statement exaggerated; but we are already familiar with the history of the great Sea Serpent, to which reptile we should, *à priori*, imagine it to be allied.

We wonder what Mr. Hawkins, of saurian notoriety would say to this monster of the "*pre-Adamite epoch*." He compares some of his specimens to Moloch, Satan, and Abaddon;† but they surely must yield the palm now.

One more extract and we have done; it is from the *Miscellaneous Intelligence*:—

* Dr. H. has published this paper, with many others, in a separate volume.—Ed.

† *Memoirs of Ichthyosauri and Plesiosauri*, by Thomas Hawkins, F.G.S., &c., &c., &c.

"We insert the following letter, which has just been received from Dr. Johnson, of Louisville, Kentucky, without further comment, at present, than merely observing that we place entire confidence in the author's statements, whose observations were made on the spot. Specimens of the substance in question have been placed in the cabinet of the Geological Society in Pennsylvania, and in the private collections of Messrs. Taylor, Harlan, and Wetherill. It is the intention of Mr. W. to analyze these grains, which appear, in some instances, to display, when fractured, a shining surface. Exposed to the blow-pipe, they are reduced to a fine white ash, and yield neither smoke nor flame. The grains represent the true Indian variety of corn.

"*Louisville, July, 1835.*

"*My dear Sir,*—I now send you, by Mr. Frazer, the *fossilized corn* of which I spoke when I last saw you. It is found in the alluvial bank of the Ohio River, about twenty-five miles below Wheeling, both above and below the mouth of Fish Creek, and extending up the creek some distance, and four or five miles on the Ohio; it may extend farther, but it shews itself only that distance by the washing of the river against the bank. The stratum is generally from eight to ten inches thick, and from five to six feet below the surface, and contains nothing but the corn grains closely impacted together with the black dust which you perceive among the corn, filling up the interstices. No *cob* or *stock* of the corn has ever been found with the grains. The same stratum has been met with in places distant from this, in digging below the surface. This is all that I could learn relative to this unaccountable and interesting deposition. Why or how did the corn get from the cob? It certainly must have been charred, or it would not have been thus preserved. It could not have been reduced to this black cinder, like the loaves of bread and grains, of different kinds, found at Pompeii, or rather it could not have resulted from a like cause. I do believe if all the corn raised on the Ohio, and all its tributaries above this point, were collected in one mass, it would not amount to one-tenth of this deposition.

"Most truly your's,

"R. HARLAN, M.D."

"J. C. JOHNSON.

There is a disposition in England to give credit to our fellow labourers in America for occasionally making "*mountains of mole-hills*" in their investigation of natural phenomena. This credulity on our part is certainly not without foundation, and until we are fully satisfied that the causes in which it has originated no longer exist, all relations emanating from the new world which border upon the marvellous will be received here with some degree of scepticism, unless supported by evidence of a most explicit and unexceptionable character. As an illustration of the very limited insight into some branches of natural science which its cultivators possessed on that continent, even within a comparatively recent period, we would refer our readers to a catalogue published a few years since, of the

objects contained in the Museum of Natural History, at the Lyceum, New York. This catalogue is drawn up by one of the leading members of that institution, and, as an indication of his competency for the task, we find ten or twelve honorary titles and three or four *et cetera's* attached to his name. The writer, after giving a list of numerous *Buccinums*, *Venuses*, *Turbos*, vertebræ and teeth of *sea-serpents*, &c., notices a flint-stone from England containing two *Echinites*, one of which is "*fast in its hole*," while the other, *mirabile dictu*, "*can be made to revolve upon its own axis!*" This remarkable phenomenon appears to have amazingly puzzled the learned compiler of the catalogue, who does not presume to attempt any solution of the problem.

With regard to the statement respecting the fossil corn, we are by no means disposed to question its authenticity, notwithstanding the apparently anomalous conditions attending its deposition. These, perhaps, may be explained when a more minute investigation has been made of the locality in which this singular stratum has been discovered. The only instance at all analogous to the present, with which we are acquainted, is the prodigious accumulation of fruits and seeds in the London clay of the Isle of Sheppy. It is not at all beyond the limits of probability to imagine that, under some circumstances, the clay might, by aqueous agency, be removed, and a continuous stratum of seeds left. We are, however, unwilling to enlarge upon so novel a fact as that related by Mr. Johnson until we have all the circumstances connected with its history before us.

In closing the present volume we cannot help expressing the gratification we have derived from its perusal, and the sincere hope that this year will not pass away without the publication of a second.

A History of British Quadrupeds. By Thomas Bell, F.R.S., F.L.S., Lecturer on Comparative Anatomy at Guy's Hospital. Illustrated by a Wood-cut of each Species, and numerous Vignettes. 8vo. London: Van Voorst. 1836.

OF all the *Vertebrata* of the British Islands, the Mammiferous, or Mastozoary,* animals have been the least frequently and efficiently delineated by the artist. While the birds have been figured with various degrees of ability and success, by Pennant, Lewin, Donovan, and the lamented Bewick; and a highly respectable work, by Meyer, on British Ornithology, is in active progress; and our

* To the newly-introduced term, *Mammal*, we have an insuperable objection; and the hybrid compound, *Mammalogy*, is not to be, for a moment, tolerated by an educated ear. There is, in fact, no such term in the Greek, as *μᾶμμα*, signifying teat or dug: and, even were it so, what would *Mammalogy* express, but dug-discourse,—not, as it is meant to imply, the doctrine of teated or Mammiferous Animals. *Mastozoology*, although not exactly to our taste, is surely far preferable, as compounded of *μαστὶς*, a dug or teat, *ζῷον*, an animal, and *λόγος*, a discourse, to the spurious, unscientific, and unmeaning "*Mammalogy*."

fishes have been iconographically displayed by Pennant and Donovan, and recently, in a style of surpassing excellence, by Yarrell, we have, at present, no illustrated publication on the British *Mammalia* at all comparable, in extent and comprehensiveness of design, or in correctness of execution, with them. The *British Zoology*, of Pennant, contains indifferently drawn figures of only seventeen species of animals belonging to this Class: the *History of Quadrupeds*, by Bewick, not more than thirty-four species. Of the shewy and expensive *History of British Quadrupeds*, by Donovan,—the only monograph on the subject with which we are acquainted,—justice forbids us to speak in any other terms than those of unqualified reprobation and contempt. Contemplated either as a work of Science or of Art, it is alike disgraceful to its author, and unworthy of the age and of the country on which it has been obtruded. Under these circumstances, we hail, with no ordinary feelings of gratification, the appearance of the first two Parts of the *History of British Quadrupeds*, some time since announced by Mr. Bell. Our expectations, highly as they have been excited by a knowledge of the character, talents, and opportunities of the author, even a cursory inspection of the commencement of his work has completely satisfied. It is quite worthy to occupy the same shelf, in the zoological library, as Yarrell's *British Fishes*: a more eloquent eulogium than this, we are unable to pronounce. If the illustrated works on British Birds, Reptiles and Amphibia, Crustacea, and Zoophytes, recently announced for publication, correspond as closely in correctness and beauty of execution, as is contemplated in form and style, with the two productions already before us, a new and most auspicious era will have dawned upon the hitherto obscure and entangled paths of British Zoography.

Parts 1 and 2 of Mr. Bell's work exhibit a description of the genera and species belonging to the *Vespertilionidæ* and *Rhinolophidæ*, of the Order *Cheiroptera*, and the Hedge-hog and the Mole, respectively arranged under the *Erinaceadæ* and *Talpidae*, of the Order *Insectivora*. The notices of the internal structure, of the generic and specific characters, and the habits and economy, of the various animals are singularly accurate and luminous, frequently original, and always interesting. The figures of the bats are, moreover, without one solitary exception, uncommonly spirited and characteristic: and those of the hedge-hog and the mole, in particular, so powerfully executed that they would make our old favorite Bewick, were he allowed to behold them, "start from the dreamless slumbers of the grave." If the volume be completed in the spirit, and with the zeal and talent, which the opening parts display, it will prove to the student of zoology in general, and more especially to the British naturalist, a most instructive and delightful work.

Until the appearance of Dr. Fleming's valuable *History of British Animals*, six species only of the Bat-Family were recognized by systematic writers, as natives of the British islands. To this scanty catalogue, a seventh species, the

Vespertilio emarginatus, was added by Fleming. Aware, or, at least, suspecting, from our own cursory observation, that some few still remained undistinguished and undescribed, still we were little prepared for the acquisition of ten new species of British *Cheiroptera*. Such, however, is absolutely the case: seventeen species are now enumerated as inhabiting Great Britain; and so clearly characterized, both by Mr. Jenyns and Mr. Bell, as to leave no shadow of a doubt upon the zoologist's mind, of their perfectly distinct nature.

This large addition having rendered necessary a new systematic distribution of the British *Cheiroptera*, we propose, in our next Number, to present a Synoptical Sketch of the Families, Genera, and Species, according to Mr. Bell's principles of characterization and plan of arrangement. To this, we shall prefix a cursory view of the anatomical structure of the Order to which these curious and interesting animals belong: sincerely hoping that the little information which our confined limits will allow us to communicate, may spur on many of our readers to a deeper study of this yet unexhausted subject, and to a profitable use of the abundant sources from which our own supplies will be principally drawn—the admirable *History of British Quadrupeds*, by Mr. Bell; and the Article, *Cheiroptera*, in Dr. Todd's excellent *Cyclopædia of Anatomy and Physiology*.

EXTRACTS FROM FOREIGN SCIENTIFIC JOURNALS.

1.—M. DE BLAINVILLE has published, in the *Nouvelles Annales du Muséum de l'Académie des Sciences*, an account of the Dodo, or Dronte (*Dipus ineptus*, L.). This remarkable bird, only at present known by an oil painting of a dried foot preserved in the British Museum, and a head and foot in the University of Oxford, has occupied much of the ornithologist's attention. It is, in fact, a remarkable circumstance that a bird of such magnitude should no longer be found, and that it should, as it were, have passed away from the face of nature. Besides the reflections that may attach to this and other circumstances, de Blainville has principally directed his researches towards establishing the zoological position of this strange bird. In 1497 and 1499, the Dodo was abundantly found by the Portuguese in an island beyond the Cape of Good Hope. The Dutch, in 1598, also found it in the same island, now called Maurice Island (Mauritius), Isle de Bourbon, Isle de France. Clusius, a Dutch author, in 1605, gave a description of this bird, under the name of Walgh-Vogel, or a disgusting bird, on account of its tough and bad-scented flesh. In 1634, Herbert describes this bird under the name of Dodo, which it still retains: he describes it as weighing upwards of fifty

pounds, very fat, and possessing a melancholy look. The portion of this bird now extant in the Oxford Museum came from the collection of Tradiscant, where it had existed prior to 1681. The bird was even intact in 1700; in 1755 the committee threw the greater part away, merely retaining the head and two feet. The oil portrait in the British Museum appears to have been painted in Holland, from a living specimen brought from the Mauritius. Collecting all the facts relating to this bird in original documents, it may be concluded that the Dodo is a massive bird, very large, not at all graceful, with short feet, and thick legs; the body oval, somewhat resembling that of a large Duck whose posterior part is not pointed; the neck is thick, short, and curved in the form of an S. The head is very large, particularly the beak; the tongue appears pointed, the leg is feathered to the knee: the toes are four in number, short, thick, and armed with strong nails, without any trace of interdigital membrane. The back is of a black colour, the head greenish gray; the feathers of the wings of the tail are white. But little is known of its habits, it appears to have possessed no powers of flight, and the stones found in its gizzard lead to a conclusion that it is graminivorous. With respect to its place in an ornithological series, ancient writers placed it near to the Swan, or the *Echassiers*. Temminck places it, as a genus of a particular order, after the series of birds: Mc Leay approximates it to the *Gallinaceæ*, and, on account of its short wings, it has also been classed with the *Ostriches*. De Blainville combats all the opinions of previous writers, and finishes by concluding that it is more nearly related to the birds of prey than any other order; adding also that he is by no means satisfied that this bird has positively become extinct; and so little being hitherto known of the natural productions of the Mauritius, it is hoped some traces may yet be discovered to throw a further light on the history of this most singular bird.

2.—M. DE LA SAUSSAYE, secretary to the next scientific congress of France, which is to be held at Blois, on the 11th of Sept. next, has published a programme of questions relative to history and natural sciences; among them are many of high interest to the antiquary and naturalist. One of these is to determine the precise spot mentioned by Cæsar as the site of the great annual meeting of the Druids, and to examine if those places in which the greater number of Druidical monuments are to be found are not also those in which christianity first founded its religious establishments. Another question of general importance is, to give the rise and progress of printing in the different localities of France. In agriculture—to examine the origin of the diseases in wheat, their effect on the animal economy, and their best mode of cure. In natural science—to determine whether it is not possible to create a mineralogical classification presenting the advantages resulting from the natural methods followed in zoology and botany. To pronounce if there exists among animals a primitive type in which all the creations of that

great class of organized beings are more or less combined. To inquire if external circumstances can so modify the organization of animals and plants as to change their specific, or even generic, characters. To examine if it is well demonstrated that the cellular tissue of plants presents a nervous system analagous to that of animals, and to indicate in what that physiological analogy consists. If there is any transformation of the cellular tissue of plants into vessels, or have the vessels an individual existence from the first instant of their manifestation. Are botanists agreed on the mode of formation of the ligneous strata in dicotyledonous vegetables.

3.—THREE new species of South American Pheasants are added to the Parisian Menagerie; their familiarity and gentleness are remarkable. The cry of the male bird distinctly utters the three syllables *ca tra ca*; the name by which they are recognised in their native localities, and that now scientifically adopted.

4.—M. DE PARAVEY has communicated to the Academy of Sciences a memoir on slate found in the primitive formations of the Meuse; in which it is observed that it possesses the property of dividing into plates, according to the given direction of the longitudinal fibres, called, by the workmen, *longrain*, according to whom no slate is good not presenting this constant and regular division. Therefore slate of a more modern formation, such as that of St. Anger's, which breaks, like glass, into irregular fractures or splinters, never lasts more than about thirty years, while that of the Ardennes exist uninjured during a lapse of two centuries; a fact proved by inscriptions on the green slates with which the roofs of some ancient monuments in Belgium are covered. It is to this peculiar property of separating lengthwise, according to the parallel direction of the fibres—which supposes a species of crystallization—that M. de Paravey wishes to draw the attention of geologists.

5.—GEOLOGISTS in France appear to be in a complete state of uncertainty respecting the supposed impressions of bird's feet in the sandstone of Hildburghausen. Do they belong to terrestrial or marine mammals—to reptiles—to saurians—to birds—or are they impressions of vegetables? The zoologist declares they are not the foot-marks of animals or reptiles, the ornithologist assures us he can trace no resemblance whatever to the feet of birds, and de Jussieu denies positively that they can be vegetable impressions. These and other contradictory opinions on geological subjects keep alive that interesting science, and must ultimately produce the most satisfactory conclusions, as well as much able discussion in the learned world.



R. Martin & Co. lith. 26 Long Ave.

Ornithorhynchus paradoxus.

ORNITHORHYNCHUS PARADOXUS.

ORDER.—PALMATA.

FAMILY.—BRUTA.



By FREDERICK RYLAND.

THIS singular animal has excited the attention of naturalists in a very great degree, from the peculiarities of its organization, which, until they were more minutely investigated, caused some doubt as to whether it could properly be arranged under any of the existing classes of *vertebrata*, and hence the name *Ornithorhynchus paradoxus* was assigned it by Professor Blumenbach, and has been retained to the present day.

The body of the animal is rather flattened horizontally, and partakes of the characters of the Otter, the Mole, and the Beaver.* Its length, measured from the extremity of the mandible to the end of the tail, varies, in full-grown specimens, from sixteen to twenty-three or twenty-four inches; the male is generally found to be, in a slight degree, larger than the female. The body is covered externally with long silky hairs of a dark-brown colour approaching to black, underneath which is a very fine soft fur of a greyish colour, the latter being thicker and softer on the under surface of the animal. In the possession of these two kinds of hair, the *Ornithorhynchus* resembles many of the amphibious quadrupeds, as the Otter and the Beaver. The tail is flat and broad, and varies in length from four and a half to six inches; the hair covering its upper surface is longer and coarser than that of any other part of the body, and projects a little distance beyond the termination of the tail.

The legs are exceedingly short; the hinder ones rather shorter than the fore legs; the feet have each five toes, connected with each other by a strong membranous expansion, like the feet of a Duck; in the fore feet, which are the largest and most powerful, the web extends a little distance beyond the extremities of the claws, whilst in the hinder feet it attains only to the roots of the claws. The claws on the fore feet are strong and blunt, and well adapted for burrowing, those on the hind feet are sharp and curved backwards. The fore feet, with their membranous web are, when expanded, four inches across, and that part of the web

* See an account of the structure and habits of the *Ornithorhynchus*, in the *Transactions of the Zoological Society of London*, vol. i., part iii., by Mr. G. Bennett, to which the author is indebted for most of the facts contained in the present article.

which projects beyond the extremities of the toes, is loose, and can, therefore, fall back when the animal burrows. Owing to this arrangement, the *Ornithorhynchus* has the full benefit of its broad foot as a paddle when swimming; and when making its way into the earth, where strength more than breadth is requisite, the falling back of the web increases the power of resistance in the foot, and, at the same time, allows the strong blunt claws to come into operation. The male has a moveable spur upon the posterior and inner surface of the hind leg, a little distance above the claws.

The head, like the body, is compressed horizontally; the eyes of a light brown colour, very small, but brilliant, are placed rather backwards. There is no projecting external ear, but the orifice of the auditory canal is situated behind and external to the eye, and the animal has the power of opening and closing it at pleasure. The mouth or beak is the most characteristic part of this curious quadruped; it is formed of two flat projecting lips or mandibles, of a cartilaginous structure, and slightly serrated at the sides; altogether bearing a very strong resemblance to the beak of the Shoveller Duck. It is of a dirty greyish black colour, and covered with innumerable minute dots. At the base of each mandible is a loose projecting fold of skin, of the same dark colour as the beak, and to this different uses have been assigned. Mr. Bennett is of opinion that it affords protection to the eyes when the animal is engaged in burrowing or seeking its food in the mud; Sir Everard Home* considers the use of these folds to be, to prevent the beak from being pushed into the soft mud beyond this part, which is so broad as completely to stop its further progress.

The possession of cheek-pouches is the only other structural peculiarity to which it is necessary to refer in the description of this animal. When recently captured, they generally contain mud and small stones mixed up with the animalculæ on which the creature feeds; and it is supposed that in these pouches the food undergoes trituration and other changes, preliminary to its digestion in the stomach.

The *Ornithorhynchus* is ovoviviparous, but suckles its young, after birth, like most other quadrupeds.

From the singular organization of this creature, we can scarcely wonder at the indcision of naturalists, in the first instance, as to what place it ought to occupy in the animal series. To increase the dilemma, it was always believed, till very recently, that the *Ornithorhynchus* propagated its species by means of eggs, but the investigations of Mr. Bennett and Mr. Owen† have completely set that question at rest. In its mode of generation, it resembles the reptile tribe; its want of bony teeth, the singular formation of its duck-like bill, and the possession of

* *Philosophical Transactions* for 1800.

† *Philosophical Transactions*, for 1834; and *Zoological Transactions*, vol. i., p. 221.

webbed feet, seem to ally this animal to the family of the water-fowl; whilst its general appearance, its hairy covering, and internal structure prove indisputably its title to be ranked amongst the mammalia.

The *Ornithorhynchus* is an inhabitant of Australia, and is found both in New Holland and in Van Dieman's land. The race is very numerous: they frequent the rivers of those countries, and form their burrows in the banks. They are called by the colonists *Water-Moles*, from a resemblance they are supposed to bear to the common European Mole. Their shyness and timidity are extreme; so that "on seeing them," says Mr. Bennett,* who had many opportunities of observing them in their native haunts, "the spectator must remain perfectly stationary, as the slightest noise or movement of the body would cause their instant disappearance, so acute are they in sight or hearing, or perhaps in both; and they seldom re-appear when they have been frightened. By remaining perfectly quiet when the animal is "up," the spectator is enabled to obtain an excellent view of its movements on the water; it seldom, however, remains longer than one or two minutes playing and paddling on the surface, soon diving again and re-appearing a short distance above or below, generally according to the direction in which it dives. It dives head foremost with an audible splash." They swim very low, so that the upper part of the back and the head only are seen above the surface of the water; and when their fur is wet, they resemble a mass of dirty weeds rather than a living animal, on which account they often escape observation.

Their food consists of river insects, small shell-fish, and other animalculæ, which they obtain for the most part by inserting their beaks into the soft mud on the sides of the rivers, and particularly at the roots of the various aquatic plants that grow in such situations. Their mode of seeking food in the mud or water is very like that of a Duck when feeding in similar places; immediately after withdrawing the beak from the mud, they raise the head, and masticate the prey they have obtained by a lateral motion of the mandibles one upon the other.

Their habitations are formed by burrowing in the banks of the rivers which they frequent. The burrows are generally about twenty feet long, but they have been found as much as fifty feet in length; they have two entrances, one of them situated three or four feet above the surface of the river, and the other a short distance below the level of the water. At the commencement they are capacious, but immediately afterwards become contracted to a size little more than sufficient to let the body of the animal pass; they proceed upwards, rather in a serpentine direction, and terminate just beneath the surface of the ground in a kind of chamber large enough to contain the mother and three or four young ones. The nest is made of dried weeds, bark, and small fibrous roots. The entrance of the burrow is so placed as to be concealed from observation by surrounding grass, weeds,

* *Loc. Cit.*, page 234.

and shrubs, and no heaps of dirt are found near it ; so that Mr. Bennett suggests the probability of the animal carrying away the loose mould collected during the excavation, in order that the heap, which would otherwise be formed, may not point out the situation of the burrow.

Mr. Bennett succeeded in capturing two full-furred young *Ornithorhyncei*, in one of the burrows that he examined. He conveyed them to Sidney, and was in hopes of sending them alive to England ; but, though they were at first very active and sprightly, in a short time they became meagre, their coats lost the sleek glossy appearance indicative of health, they ate little, and at length died, about five weeks from the period of their capture. As his opportunities of observing these animals were considerable, and his account of their habits is the only one of much value that we possess, I shall not hesitate to transcribe, in his own words, some of the observations he made upon their proceedings.

“The young animals sleep in various postures, sometimes in an extended position, and often rolled up like a hedgehog, in the form of a ball.” The latter posture, which is a favourite one with them, “is effected by the fore paws being placed under the beak, with the head and mandibles bent down towards the tail, the hind paws crossed over the mandibles, and the tail turned up ; thus completing the rotundity of the figure. They usually reposed side by side, like a pair of furred balls, and awful little growls issued from them when disturbed ; but when very sound asleep, they might be handled and examined with impunity. One evening, both the animals came out about dusk, went as usual, and eat food from the saucer, and then commenced playing one with the other like two puppies, attacking with their mandibles, and raising the fore paws against each other. In the struggle one would get thrust down, and at the moment when the spectator would expect it to rise again and renew the combat, it would commence scratching itself, its antagonist looking on, and waiting for the sport to be renewed.” They were very fond of combing themselves with their hind feet ; an operation they generally performed after being in the water, and before retiring for the night. “It was most ludicrous to observe these uncouth-looking little beasts running about, overturning and seizing one another with their mandibles, and then, in the midst of their fun and frolic, coolly inclining to one side, and scratching themselves in the gentlest manner possible. After the cleaning operation was concluded, they would perambulate the room for a short time, and then seek repose.” Their mode of climbing to the summit of a book-case, or any other elevated piece of furniture, is very surprising, because the opportunity of exercising such an instinct or propensity could scarcely have occurred to them when in a state of nature ; it reminds one of a late celebrated escape from Newgate. “This was at last discovered to be effected by the animal supporting its back against the wall, and placing its feet against the book-case, and thus, by means of the strong cutaneous muscles of the back, and the claws of the feet, contriving to reach the top

very expeditiously. They performed this mode of climbing often, so that I had frequent opportunities of witnessing the manner in which it was done."

As far as we are at present acquainted with the disposition of the *Ornithorhynchus*, it is free from vicious propensities; its extreme timidity induces it to seek for solitude, and to haunt only the most unfrequented parts of rivers; when handled or disturbed, it evinces its impatience and dislike by a low growl, but never shews a disposition to bite or scratch. It has been asserted that the spur with which the hind leg of the male is armed is perforated, and that through it a poisonous secretion is discharged, when the animal is irritated.* Mr. Bennett endeavoured to ascertain the correctness of this, by seizing the hind leg of the male animal, and roughly handling him; but he could not perceive that any effort was made to avail himself of the spur in his defence, and he appears to think, therefore, that the statement touching the use of the spur is entirely groundless.

This animal, though not strictly amphibious, appears to spend as much of its time on the water as on the land; its short legs and webbed feet are better adapted for urging the body through the former element than over the surface of the latter. In the water it finds its food, in the immediate vicinity of the water it constructs its habitation. Mr. Bennett generally indulged his captives with an occasional swim, in which they seemed to take great delight. When placed near the water (a cord having been fastened round the hind leg to prevent escape), they would instinctively find their way into it, and travel up and down the stream, at the same time shewing a partiality for those places that most abounded in aquatic weeds. After swimming and feeding, they laid themselves down on the grassy bank, combing and cleaning their coats with the claws of the hind feet.

I am not aware that this animal has, as yet, been made, in any way, serviceable to the human race. The natives of Australia use them as food, but as they devour, with equal avidity, frogs, snakes, and rats, this cannot be considered as any very great recommendation of their edible qualities.

Besides the name of *Ornithorhynchus*, this animal is commonly known by the name of *Platypus*, which was given to it by Dr. Shaw; and it is still more frequently called the Duck-billed Animal, from the peculiar form of its beak.

* *History of Austral-Asia*, by R. M. Martin, F.S.S., page 111.

ON THE MORAL ADVANTAGES OF THE STUDY OF NATURE.

THOUGH it may seem superfluous to offer any observations on this subject in a work not likely, in the present stage of its career, to fall into the hands of readers not already devoted to the pursuit of Natural History, yet we are induced to do so in the hope that, if they should approve our remarks, they may point them out to their friends, and so perchance increase the number of the cultivators of natural science. It is more particularly with a view to excite the attention of parents and teachers that we throw out these suggestions, since it is more especially in their power to give them effect. These influential persons would we intreat in favour of those interesting beings, the members of the rising generation, committed to their care. We would appeal to every feeling and principle of their better nature, in their behalf. Few parents can be charged with neglecting the bodily health of their children, though some err in the choice of the means by which it is to be promoted ; but many, very many, are either indifferent to the mental and spiritual welfare of their offspring, or err grievously in the choice of the means by which they are to be secured. The education which is necessary to fit an individual for the discharge of the *social* duties of his station, and for forwarding the interests of the community, it is undoubtedly right that he should receive. But man lives not for society alone, but also for himself ; he lives not for time only, but for eternity : and an education is required for these too, which, in many cases, he never receives, or at least never has provided for him by his parents.

Let us not be misunderstood, nor let it be supposed that we undervalue or would dispense with classical learning, or the kind of learning necessary to carry on mercantile affairs. Far from it : our wish is that they should have that, and much more. While some of their time is devoted to acquire those languages by which man has held, or still holds, intercourse and sweet communion with his fellow men, improvement and enlargement of their minds must follow. But while we teach them many tongues, and enable them to read many books, shall we leave them ignorant of the signs and characters of the book of nature, or give them no opportunity of perusing the bright volume of creation, the pages of which are daily and annually unrolled before us, containing the autograph of its mighty author, and which, to use the impressive words of Lord Bacon, “is written in the only language that hath gone out to all the ends of the earth, unaffected by the confusion of Babel.”

Alas ! that we should teach them to read what will only enable them to “heap up riches, *while they know not who shall gather them,*” and fail to teach them how to commune with their God, and to acquire a portion of that treasure which they, *and not another,* shall inherit throughout eternity.

Those who are born and bred in large cities are rarely permitted, still less purposely led out, to see the face of nature, to trace her lineaments, and feel the influence of her smiles. They are not taught to regard her as the common mother

of all organized beings, nor to look upon her with the eyes of affectionate children. The case is not altered when they are sent to any of the schools, whether suburban or remote from the city of their birth ; for in the walks which are then taken, as a part of the system, they are made to march, during the stated period, only for the health of the body, in formal columns, and not allowed to delay to examine any natural object, nor even to turn their eyes either to the right side or the left. And thus they quit these seminaries as ignorant of the operations of nature as if they had continued to dwell in the centre of the most crowded metropolis, or had been denied all use of the organ of sight. This important period of life, when they are so susceptible of receiving beneficial impressions from the examination of the works of creation, being allowed to pass unimproved, the parent imagines he has discharged his duty to his children if he then places them at the entrance of the paths which lead to wealth, to honour, to glory, or to power. But the fondest hopes may be disappointed, the best laid schemes for arriving at distinction may be frustrated, and the unsuccessful candidate may be compelled to retire from the busy mart, and to close those books and correspondence which he trusted would have proved the instruments of his gain, and betake himself to an obscure or solitary abode, far from the smoke of cities and the hum of men. How irksomely must pass his days, what a dreary and desolate void must be his existence, if, from ignorance of its alphabet, the book of natural wisdom lies open before him in vain,

“ — where, beneath the white-armed beach,
By valley’s stream, or hillock’s verdant crown,
Her simple lesson nature waits to teach.”

But suppose the greatest success to have attended his efforts, and that he has become the possessor of “ woods, and lawns, and long-withdrawing vales.” His bosom may dilate when his eye surveys the fruit of his toil and his gratified ambition, and his ear may be regaled with the lowing of his cattle on a thousand hills ; but all these he must leave to another, nor can it be said that while in possession of them his mind was more improved, or even as much, as that of the ploughman who tilled his acres, or the herd who tended his flocks, if the latter, and not the former, saw and understood, and traced to their source, the operations of nature continually taking place around them, and which could alone render his lands productive, and his position an object of vulgar envy.

An able divine (the Rev. W. Jones, of Nayland) has well observed—“ Let a man have all the world can give him, he is still miserable, if he has a grovelling, unlettered, indevout mind. Let him have his gardens, his fields, his woods, his lawns, for grandeur, plenty, ornament, and gratification : while at the same time *God* is not in all his *thoughts* ; and let another have neither field nor garden, let him only look at nature with an enlightened mind—a mind which can see and adore the Creator in his works, can consider them as demonstrations of his

power, his wisdom, his goodness, and his truth : this man is greater, as well as happier, in his poverty, than the other in his riches. The one is but a little higher than a beast, the other but a little lower than an angel."

The very leisure for which the wealthy merchant sighed may prove his greatest bane, and, finding time hang heavy, and deprived of the excitement connected with his former pursuits, he may, as a substitute, betake himself to debasing and ruinous ones—to gambling, or dissipation, and perchance impair, if not lose, his fortune, and, to meet the consequences of his extravagance, may oppress his tenants whom he should befriend, and, becoming morose and selfish, introduce misery and distress into his domestic circle.

"But," says Dr. Drummond, in his excellent *Letters to a Young Naturalist*, "who are these men to whom time is a burden? Are they geologists, or astronomers, or chemists? Are they botanists, or landscape painters? Are they entomologists, are they naturalists or philosophers of any kind? We may safely, I believe, answer in the negative. No one who pursues science is likely to complain of the *ennui* of modern times; and I feel convinced that science, in union with natural religion, is the pursuit best of all calculated to make our time pass happily, and the world we inhabit seem a paradise."

Another writer (Dr. Boot) has eloquently said—"There is a mysterious communion between the mind and heart of man and the sights and sounds of natural objects. A voice, descending from heaven, and borne upon the breath of morn, is heard along the enamelled mead, or through the mazes of the dark forest, which penetrates to the sources of our thoughts and affections, and which kindles a spirit of devotion to light and warm our own bosoms, to be thence reflected upon all around us. Listen to its instructions in the delightful solitude of your occasionally secluded hours, far from the contaminating influence of worldly ambition; and you will return to society with feelings better adapted to the discharge of your duties there, and in possession of a mean for happiness of which no adversity can rob you, and with a refinement of mind which no prosperity can vitiate."

Nor is it only in the joyous morn or active noon of life that these things should engage our attention, or are capable of yielding pleasure, and bringing with them their reward. For after a long period of usefulness to ourselves and others, when the sun of our day begins to cast lengthened and prophetic shadows along the vale of life, we naturally feel anxious to retire, to repose and meditate awhile, ere we quit this for another scene of being. Then what occupation can be found so calm and tranquil, so befitting the evening of life, as the contemplation of the objects of nature? In observing and considering "the lilies, how they grow," we at once comply with the divine injunction and reap the benefit of our compliance, in finding our minds gradually purified from those stains of earth which even the best of us contract during a lengthened intercourse with the world, and so become progressively prepared for the change which awaits us.—Z.

HISTORY OF THE COMMON DIPPER, (*CINCLUS AQUATICUS*).

BY WILLIAM MAC GILLIVRAY, A.M., F.R.S.E., M.W.S., &c.,

CONSERVATOR OF THE MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

THE Dipper is, in many respects, one of the most interesting of our native birds. Residing chiefly in the wild glens of the mountainous districts, it now and then presents itself to the wandering naturalist as it flits along the streams, or is seen perched on a stone in the midst of the water; the white patch on its breast rendering it conspicuous at a great distance. Even the mere collector of plants—who, of all men, seems to be the least capable of comprehending the harmonies of nature—pauses to gaze upon it, as it shoots past him in its rapid and even flight; the solitary shepherd, wending his way to the mountain corry, meets it with delight; and the patient and contemplative angler, as he guides his tackle over the deep pool, smiles upon the tiny fisher whose frequent becks have attracted his notice. The singular circumstance of its obtaining its food under the surface of the water, although in form and structure it is allied to the Thrushes and other land birds, has especially drawn the attention of ornithologists to it; and the explanation of its mode of progression in that element has exercised their ingenuity, although very few have based their conjectures on actual observation. Lastly, the land-proprietor or his factor, too much occupied with other pursuits to inquire for themselves, and trusting to the reports of prejudiced persons, direct their gamekeepers and shepherds to destroy the lively and harmless creature whenever an opportunity occurs, because it has been supposed to destroy the eggs and fry of the salmon.

This bird having, in a particular manner, attracted my attention in the course of my many rambles, I have been enabled in some measure to trace its history, which I now have the pleasure of presenting to the readers of *The Naturalist*, assuring them that it contains nothing but the results of long-continued observation. In the first place, however, I shall give the generic characters of *Cinclus*, of which only three species are known to me: *C. Pallasii*, found by Professor Pallas, in the Crimea; *C. Americanus*, which inhabits Mexico and the Rocky Mountains; and *C. aquaticus*, found in most parts of Europe.

CINCLUS,—(Bechst). DIPPER.

Bill rather short, slender, slightly ascending, deeper than broad at the base, much compressed towards the end. Upper mandible, with the dorsal line, slightly arched, the ridge rounded, the sides convex, the edges sharp and inflected, with an obscure notch close to the narrow, somewhat deflected, tip. Lower mandible slightly bent upwards, the angle medial and very narrow, the crura having the

sides sloping outwards, the dorsal line slightly convex, the ridge narrow and rounded, the tip rather acute. Mouth very narrow; upper mandible internally narrow, concave, with a central depressed line; palate nearly flat; aperture of the posterior nares linear, margined with acute papillæ; lower mandible concave, with a central prominent line. Tongue slightly extensile, sagittate, narrow, grooved, serrulato-setose towards the end, and terminated by two bristle-points. Œsophagus of nearly uniform diameter; proventriculus with oblong simple glandules. Stomach muscular, compressed, with two roundish central tendons; its cuticular coat dense, tough, and rugous. Intestine of nearly uniform diameter; two very small vermiform cæca.

Nostrils linear, direct, with a bare margin above, in the lower and fore part of the nasal membrane, which is covered with very short feathers. Eyes rather small; eyelids densely feathered. Aperture of external ear round, of moderate size.

Head oblong, rather small, compressed, the forehead low. Neck rather short. Body compact, rather deeper than broad. Legs strong, of ordinary length; tarsus compressed, covered anteriorly with a long undivided plate and four inferior scutella, posteriorly with two long plates united at a very acute angle, and several transverse rugæ below. Toes rather large and strong, covered above with a few plates, papillar beneath; first, second, and fourth nearly equal, third much longer; second slightly connected at the base, by a web, with the third, which is connected with the fourth by a longer but narrower web, as far as the second joint of each. Claws short, bluntish, much compressed, slightly margined, laterally grooved, that of the hind toe considerably larger.

Plumage ordinary, rather compact, the feathers oblong and rounded; those about the base of the bill very short and somewhat velvety, without bristly points. No bristles at the base of the bill. Wings rather short, broad, rounded; primary quills ten, the first very short and narrow, the third longest, and, with the next three, slightly cut out on the outer web towards the end; secondary quills nine, long, broad, rounded; all the quills much decurved. Tail short, even, of twelve broadish feathers, which are slightly decurved. Legs feathered to the tibio-tarsal joint. The whole body closely covered with down, as in the diving sea-birds.

Cinclus aquaticus,—(Bechst). *The Common Dipper*.

The Dipper, Water Ouzel, or Water Crow, is remarkable for the compactness of its form, in which respect, as well as in some of its motions and attitudes, it bears more resemblance to the Kingfisher and the Common Wren, than to any other British bird. Among foreign birds, the species of the genus *Pitta*, are those which approach nearest to it in form. Its plumage is of ordinary length, soft, rather compact, slightly glossed, very short on the fore part of the head,

where it resembles that of the diving palmipede birds. The wings, when closed, reach one-third down the tail, and when expanded are of a semi-ovate form, broad and rounded. The first quill is very short and narrow; the third longest, but the second and fourth are scarcely shorter. The quills are all much curved downwards, the secondaries slightly bent inwards, all rounded. The tail is short and even.

The bill is blueish-black, tinged with brown at the edges; the inside of the mandibles blackish; the palate white; the tongue blackish anteriorly, yellowish behind. Iris pale brown, with a ring of black in the middle. Tarsi and toes blueish grey, tinged with brown; claws dusky. Head and hind-neck deep brown; both eye-lids with a white speck. The general colour of the upper parts is dark-grey, each feather broadly margined with black. First row of coverts and all the quills slightly tipped with pale grey; the quills and tail dark brown, tinged with grey. Throat and fore-neck pure white; breast chestnut-brown, that colour gradually blended with the deep grey of the abdomen. Sides and lower tail-coverts of a lighter grey, the latter slightly tipped with pale-brown. The down and the downy parts of the feathers, are dull dark-greyish-blue, the concealed part of the shafts whitish.

The œsophagus is two inches long, its glandular part five-twelfths. The stomach is oblong, compressed, muscular, the cuticular coat hard and rugous. Intestine twelve inches long, diminishing a little in diameter towards the cœca, which come off at the distance of about an inch from the extremity, and are only $\frac{1}{8}$ of an inch in length.

The entire length is $7\frac{3}{4}$ inches; bill $\frac{5}{8}$ along the ridge, 9-8ths along the edge; extent of wings $12\frac{1}{4}$; wing from flexure $3\frac{3}{4}$; longest quill $2\frac{1}{2}$; tail $2\frac{1}{4}$; tarsus $1\frac{1}{4}$, middle toe $1\frac{1}{8}$.

The female differs very little from the male in external appearance, the brown of the head being merely a little lighter, the brownish-red of the breast less intense, and the white of the fore-neck of somewhat less extent. Length $7\frac{1}{4}$; bill $\frac{7}{8}$; extent of wings 11; tarsus $1\frac{1}{8}$; middle toe 1 and 1-16th inches.

Adult individuals vary chiefly with respect to the tints of the breast, that part having more or less of the red or chestnut colour, and sometimes a white band down the centre. The changes that take place in the plumage, as it becomes old and worn, are not very remarkable. The tail-feathers and primary quills are those which suffer most from rubbing.

The Dipper frequents the sides of rivers and streams of inferior magnitude, especially such as are clear and rapid, with pebbly or rocky margins. I have met with it in every part of Scotland, as well as in the hilly portions of Cumberland and Westmoreland; and it is said, by Montagu, to occur in Wales and Devonshire. In Scotland, it is not peculiar to the mountainous regions, being found in the lowest parts of the Lothians, as well as on the alpine rills of the Grampians,

and other elevated tracts ; but it is generally more abundant in hilly ground, and, although never common in any district, is nowhere more plentiful than on the Tweed and its tributaries in the pastoral counties of Peebles and Selkirk. It is also a well-known bird in all the larger Hebrides. It is not only a permanent resident, but seldom shifts its station to any great extent, excepting during continued frosts, when it descends along the streams, and is seen flitting about by the rapids and falls. On lakes having a muddy or peaty bottom I have never observed it ; but it may sometimes be seen on those which are shallow and pebbly at the margins, as on St. Mary's Loch, where I have shot it.

The flight of the Dipper is steady, direct, and rapid, like that of the Kingfisher, being effected by regularly timed and quick beats of the wings, without intermissions or sailings. It perches on stones or projecting crags by the sides of streams, or in the water, where it may be seen frequently inclining the breast downwards, and jerking up the tail, much in the manner of the Wheatear and Stonechat, and still more of the Wren ; its legs bent, its neck retracted, and its wings slightly drooping. It plunges into the water, not dreading the force of the current, dives and makes its way beneath the surface, generally moving against the stream, and often with surprising speed. It does not, however, immerse itself head foremost, like the Kingfisher, the Tern, or the Gannet ; but either walks out into the water, or alights upon its surface, and then plunges like an Auk or Guillemot. I have seen it moving under water in situations where I could observe it with certainty, and I readily perceived that its actions were precisely similar to those of the Divers, Mergansers, and Cormorants, which I have often watched from an eminence as they pursued the shoals of Sand-eels along the sandy shores of the Hebrides. It, in fact, flew—not merely using the wing from the carpal joint, but extending it considerably and employing its whole extent, just as if moving in the air. The general direction of the body in these circumstances is obliquely downwards ; and great force is evidently used to counteract the effects of gravity, the bird finding it difficult to keep itself at the bottom. Montagu well describes the appearance which it presents under such circumstances :—" In one or two instances, where we have been able to perceive it under water, it appeared to tumble about in a very extraordinary manner, with its head downwards, as if picking something ; and at the same time great exertion was used, both by the wings and legs." When searching for food, it does not proceed to great distances under water ; but, alighting on some spot, sinks, and soon reappears in the immediate neighbourhood, when it either dives again, or rises on the wing to drop somewhere else on the stream, or settle on a stone. The assertion of its walking below the water, which some persons have ventured, is not made good by observation nor countenanced by reason. The Dipper is by no means a walking bird : even on land I have never seen it move more than a few steps, which it accomplished by a kind of leaping motion. Its short legs and long curved claws are

very ill adapted for running, but admirably calculated for securing a steady footing on slippery stones, whether above or beneath the surface of the water.

My first opportunities of observing this bird moving under water were in Braemar, in 1819 ; since which time I have had much pleasure in taking notice of it in various parts of the country. In September, 1832, I watched a Dipper for some time, on a part of the Tweed, where the current was very rapid. It flew off from the shore, and alighted in the middle of the stream, where it immediately dived. Re-appearing a little way farther up the river, it floated for a few seconds, dived, emerged, and flew to the opposite bank, on reaching which it again disappeared under water for a short time, and thus continued its exertions. When perched on a stone near the shore, it usually makes short incursions into the water, apparently for the purpose of procuring food, and returns to its station. On these occasions it is not difficult to approach it, provided due precaution be used ; but in general it is shy and easily alarmed.

In August, 1834, while ascending White Coom, the highest mountain in Dumfriesshire, accompanied by a boy, I observed a Dipper retreating beneath a large stone, over which the water fell, in the midst of a streamlet that flowed along the bottom of a narrow scar or rut. Imagining that its nest or young might be concealed there, we went up to the place, and, on seeing the bird behind the little waterfall, endeavoured to catch it, on which it sallied forth, plunged into a pool, and attempted to escape down the stream, but without success, for we met it at every turn, and it was obliged to betake itself again to its retreat. We now turned off the water from the stone, when it again plunged into the pool, and after some turnings, at length effected its escape. This bird on emerging at some distance, flew off : and I considered it strange that it had not used its wings from the beginning, as it certainly could have more easily escaped through the air than through the water. The chase afforded another rare opportunity of viewing its subaqueous flight, which, in all probability, was caused by excessive alarm.

On being wounded, it commonly plunges into the water, flies beneath its surface to the shore, and conceals itself among the stones or under the bank. In fact, on all such occasions, if enough of life remains, it is sure to hide itself, so that one requires to look sharply after it. In this respect it greatly resembles the Common Gallinule, or Water-hen. In the winter of 1829, I shot one on the Almond, which flew to the other side, walked deliberately out into the water, disappeared, and slowly emerged under a bank at some distance, where I found it after crossing the stream. Another had just strength sufficient to fly into a deep hole under a bridge on the Yarrow, partially filled with water, on which it was found floating, dead. In August, 1834, I shot a Dipper on Mannor Water, in Tweeddale, when it flew off, dived, and hid itself under a bank, on which I forded the stream and endeavoured to secure it, but it slipped out under water, swam down the current twenty yards or so, and got under a large stone, where it was traced. The intro-

duction of the gun-rod only caused the persecuted bird to retreat as far as it could, and when I was employed in removing some pebbles and gravel from behind the stone, it slipped out under water, and proceeded down the stream a considerable way before it rose to breathe. I noticed the place where it dived in under the bank, and it being at length obliged to come up to respire I met the bird with my hand, and so secured it.

Men are not much accustomed to regard with interest or compassion the sufferings of animals, especially of the smaller species; and although the death of an Elephant at Exeter 'Change, or a Giraffe in Windsor Park, may make a great noise—that of a Mouse in a trap, or a Snipe in a springe, is as little considered as the fall of a leaf or a flake of snow. The most melancholy ornithological exhibition that I remember to have witnessed, was that of a wounded Dipper, which was shot through the lungs, above Cramond Bridge, near Edinburgh. It stood still without attempting to fly off, apparently insensible to all external objects, its legs bent, its wings drooping, its head declined. The blood was oozing from its side and gurgling in its windpipe, which the poor bird made ineffectual efforts to clear. At intervals, a convulsive heaving of the chest took place, followed by an effort to vomit; and in this state the sufferer stood for five minutes until I got over the stream to it, when it expired in my hand. In the agony of death, the pupil became contracted to a mere point, and presently after dilated; when the lower eyelid gradually rose and covered the eye. This is commonly the case in birds, which do not expire with the eyes open, like man and most quadrupeds.

I may here remark that there are two very expeditious modes of killing a wounded bird: one, first shewn to me by my friend Mr. Audubon, consists of squeezing with the finger and thumb the sides of the bird against its heart, which in a very few seconds ceases to act: the other, which is still more rapidly effectual, is to introduce a pin between the occiput and atlas, and thus lacerate the spinal cord.

When wounded and caught, the Dipper struggles hard, grasping firmly with the feet, but does not attempt to bite. I mention this circumstance as common to certain species of birds, such as the Fieldfare, Blackbird, and Starling, which, without possessing the power of annoying their enemy, yet do not tamely suffer themselves to be destroyed, but struggle to the last, undismayed and ready to use the slightest chance of escape. Other species, equal in strength, such as the Snipe, the Golden Plover, and the Lapwing, do not struggle so vigorously, but meet their fate in a quiet and apparently stupid manner. Some birds, again, such as the Titmice and some *Sylvia*, although evidently extremely frightened on being seized, watch every opportunity of biting. I need scarcely add that some, as the Kestrel and Sparrowhawk, grasp and bite with as much good will as effect. These diversities of character may in general be traced to differences in organization; but the general rules or laws to which one might attempt to reduce them are not easily detected.

The food of the Dipper is said, by authors, to consist of small fishes, roe, and water-insects; and there is nothing incredible in this, although these persons have not asserted that they have observed fish or their eggs in the stomach of this species. I have opened not a few, at all seasons of the year, and have never found any other substances than *Lymnææ*, *Ancyli*, *Coleoptera*, and grains of gravel. As to the ova and fry of the Salmon, there is no evidence whatever that the Dipper ever swallows them; and, therefore, the persecution to which this bird has been subjected in consequence of the mere suspicion, ought to cease until the fact be proved. With respect to the sand and gravel, which many birds, insectivorous as well as granivorous, swallow, I may here remark that none of it, so far as I have observed, ever passes into the intestines, excepting in the tribe of Geese and Ducks.

The Dipper is generally seen in pairs, sometimes singly, and, at the breeding season, in families, but never in flocks. To the naturalist, its occurrence along the streams of our wild and mountainous districts is peculiarly delightful. Even shepherds and labourers take special notice of it; the Water Crow, as it is commonly named, being familiar to the inhabitants of such districts as it frequents. Its song is short, but lively, and continued at intervals. It bears no resemblance to that of any species of Thrush, excepting the Redwing, but is not unlike the subdued song of the Starlings. This gentle warble is not confined to any period of the year, but may be heard during sunny weather at all seasons. Its common note, which it frequently utters while perched on a stone or while flying along the stream, resembles the syllable, *chit*.

Early in spring the Dipper begins to form its nest, so that its first brood is abroad at the same time with that of the Blackbird. The nest is bulky, composed of mosses, grass, and roots, lined with dry leaves and covered with an arch of the same materials. It is placed among the moss on the bank of a stream, or among the roots of a tree in a concealed place overhanging the water, sometimes in a crevice of the rock, or under a bridge. The eggs, five or six in number, are of a regular oval form, rather pointed, pure white, generally eleven-twelfths of an inch long, and nearly nine-twelfths in their greatest breadth.

The general colour of the upper parts of the young bird when fledged is dull grey, lighter than that of the adult; the head and hind-neck are of the same colour as the back, all the feathers being margined with brownish-black. The wings are brownish-black; the quills, alula, and larger coverts margined with grey, the latter slightly tipped with greyish-white. The throat, fore-neck, and breast are of a delicate pale-buff or cream colour intermixed with blackish, the margins of all the feathers being of the latter colour. The upper and hind part of the sides, the abdomen, and lower tail-coverts, are dull grey, mixed with cream colour, and the proximal tail-coverts are chiefly of the latter. The tail is like the wings, but tipped with brownish-white. The bill and eyes are as in the adult; but the tarsi

are paler anteriorly, as are the toes, and the claws are hair-brown, margined with whiteish.

At the first autumnal moult, which takes place in September, the young assume nearly the appearance of the adults: the fore-neck becomes white, the breast dusky, with more or less red, and the head brown; but it is not until the second change that the colours are completed.

Several curious circumstances are observed with respect to the bill of the Dipper. In the first place, when the bird is young, it precisely resembles that of the genus *Turdus*, being merely a little more slender; but when the bird is advanced in age, it is not merely proportionally, but actually much shorter, and the tips, by being rubbed, become similar to those of the bill of the Woodpeckers, although less neatly wedged. In this respect, the Dipper resembles the Oystercatcher; and the change in the form of the bill is caused by the same action in both species. Again, in old birds, the thin edges of the mandibles become marked with parallel cuts, similar to those of the mandibles of the Gannet, although generally perpendicular, as in the Jabiru.

The Dipper, which in the form of its bill and feet, and in the structure of its digestive organs, is allied to the Thrushes, *Pittæ*, and *Chamæzæ*, is singular in respect to its plumage, which is in a great measure that of an aquatic bird. The parts of the body which in these birds are bare of down, are in it closely covered; bristles are entirely wanting at the base of the bill; the feathers on the fore part of the head are very short; the wings and tail are also short; and the body being nearly as broad as deep, the adaption for floating and diving is obvious, although the feet are not webbed, and the claws rather large, compressed, and curved. These latter circumstances shew that the bird is not fitted for pursuing fishes under water; and, as I have remarked, although authors conjecture that fish forms part of its food, none of them assert that they know this to be the case from actual observation.

The digestive organs are entirely analogous to those of the Thrushes, and other allied genera, but bear no resemblance to those of the piscivorous birds, the œsophagus being narrow and the stomach a true gizzard. The bird is destined to feed upon aquatic insects and mollusca, which adhere to the stones under the water. It is, therefore, fitted for making its way to the bottom at small depths, and maintaining itself there for a short time—a minute or more; in conformity with which design, its plumage is short and dense, its tail short, its wings short, broad, and strong, its bill unincumbered by bristles and of the proper form for seizing small objects. Having its feet constructed like those of a Thrush, but proportionally stronger, the Dipper thus forms a connecting link between the slender-billed passerine birds and the diving palmipedes, as the Kingfisher seems to unite them with the plunging birds of the same order, or perhaps with the Herons.

In this account of a bird with which I have been in some measure familiar for years, I have refrained from all poetical embellishment, and confined myself entirely to the results of observation ; judging that histories of birds constructed on the plan of a fashionable romance are not such as can gratify the taste of the real lover of nature. And in truth the realities of existence are much more admirable than the creations of the most unbridled imagination.

ON THE SILURIAN AND OTHER ROCKS OF THE DUDLEY AND WOLVERHAMPTON COAL-FIELD,*

FOLLOWED BY A SKETCH PROVING THE LICKEY QUARTZ ROCK TO BE OF THE
SAME AGE AS THE CARADOC SANDSTONE.

BY RODERICK IMPEY MURCHISON, ESQ., F.G.S., V.P.R.S.

The author having previously shown that the coal-field extending from Dudley into the adjacent parts of Staffordshire is surrounded and overlaid by the lower member of the new red sandstone, laid before the Society an Ordnance map, geologically coloured, and then proceeded to give, 1st, A general sketch of the structure of the coal-field in descending order : 2ndly, Detailed accounts of the Silurian rocks which protrude through the coal measures or lie beneath them : 3rdly, A sketch of the quartz rocks of the Lickey : 4thly, A description of the trap rocks : 5thly, General remarks upon the dislocation of the stratified deposits ; and the dependence of these phenomena upon the intrusion of trap rocks.

1. *Coal measures*.—In most parts of the productive coal-field the coal measures are covered by a considerable quantity of detritus, the greater part of which has been derived from the breaking up of the new red sandstone which once overspread this tract, with which are mixed, especially in the northern part of the field, a few boulders of northern origin and some from the surrounding region.

General and detailed sections are then given of the regular succession of the carboniferous strata ; for the greater part of which in the neighbourhood of Dudley, and for much valuable information, Mr. Murchison expresses great obligation to Mr. Downing ; the best sections of the Wolverhampton field having been afforded by Mr. J. Barker. The principal points of novelty consist in drawing a

* The following Paper, which was read before the Geological Society of London, on the 11th of May, is published with the permission of the author.—ED.

clear distinction between the upper or thicker measures, which contain the ten-yard coal, generally known as the Dudley coal, and the *underlying* carbonaceous strata, or ironstone measures. The latter, rising from beneath the ten-yard coal, range to the N.N.E. from Wednesbury and Bilston, in a long tract between the parallels of Walsall and Wolverhampton, extending to Cannock Chace. At the southern end of the field, emerging from beneath the ten-yard coal, they occupy the district between Stourbridge and Hales Owen, containing the well-known "fire clay;" though some of the most valuable of the Wolverhampton iron-stones, beneath those called the "New Mine," are here wanting, viz. the "Gubbins," and "Blue Flats." This poverty in the lower coal measures extends over all the district south of Dudley. In the northern and southern end of the district, these lower measures represent the whole carboniferous system; and in various natural sections near the Hagley and Clent hills, the author has detected them, in very feeble bands, passing upwards and conformably into the lower new red sandstone. Besides the open works formerly alluded to by him in previous memoirs, Mr. M. now states, that his former conjectures respecting the passage of the ten-yard coal beneath the new red sandstone which flanks it on the east and west, have been verified by the efforts of the Earl of Dartmouth, who, after sinking to a depth of 151 yards through strata of the lower new red sandstone, has very recently succeeded by further borings, carried down to the depth of 290 yards, in discovering the one-foot, two-foot, and "Brooch" coal seams, which *overlie* the ten-yard coal throughout the Dudley field. These operations have taken place at Christchurch, one mile beyond the superficial boundary of the coal field.

Besides the plants so common in all carboniferous tracts, the author has observed the presence of animal organic remains. Unios of several species are abundant; and in the northern or lower part of the field he has extracted fragments of fishes, which have been named by Professor Agassiz, *Megalichthys Hibbertii*, *M. Sauroides*, and *Diptodus gibbus*; together with scales, coprolites, &c., proving an identity between the animals deposited in these coal measures and those of Edinburgh, described by Dr. Hibbert. The same species, it will be recollected, have been pointed out by Sir Philip Egerton, as occurring in the N. Staffordshire coal-field, and one of them has been observed by Mr. Prestwich in the coal-field of Coalbrook Dale. Mr. Murchison, however, remarks that he has not yet observed any marine remains in these coal measures similar to those of Coalbrook Dale; and nothing *yet* found can invalidate the inference that the coal of Dudley and Wolverhampton may have been accumulated exclusively in fresh water.

b. Silurian rocks.—The mountain or carboniferous limestone and the old red sandstone, which in so many other parts of England form the support of coal tracts, being wanting, this field reposes directly on rocks which Mr. Murchison proves to consist of the two *upper members of the Silurian system*, viz., the "Ludlow

rocks," and "Wenlock limestone."* As, however, these rocks rise up irregularly, like separate islands, through the surrounding coal measures, and not in their regular order of superposition, so it was obviously impracticable to have determined their *relative* age by any local evidences; and hence no attempts could have been made to distinguish the younger from the older deposits, until the structure and organic remains of the different members of the Silurian system had been fairly worked out in other districts, where these types were fully and clearly displayed in their regular order.

2. *Ludlow rocks*.—These rocks appear at the surface in three detached points in this coal-field, viz., Sedgeley, Turner's Hill, and the Hayes. At Sedgeley they are thrown up in an elongated ellipse, very much resembling a large inverted ship, of which Sedgeley Beacon, 630 feet above the sea, may be considered as the keel. The upper Ludlow rock, though not thick, is plainly marked by containing the *Laptæna lata*, the *Serpula gigantea*, &c., and by overlying a limestone which is in every respect identical with that of *Aymestrey* or the middle member of the *Ludlow* rocks, presenting the same lithological structure, *i. e.* a dull argillaceous grey limestone, which among other well-known shells, such as the *Terebratula Wilsoni* and the *Lingula*, contains also the beautiful *Pentamerus Knightii* so entirely *peculiar* to this stratum. As at Ludlow and Aymestrey, this limestone of Sedgeley, known here as the "black limestone," forms an excellent cement under water.

Turner's Hill, a small elevation between Gornals and Himley, is composed of Ludlow rocks; and the Hayes is a narrow short tongue of the same, with a central band of limestone, which rises at a high angle from beneath the coal measures, on the main road from Stourbridge to Hales Owen, a portion of the lower Ludlow rock being also well exposed.

2a. *Wenlock limestone*.—This limestone formation is much more largely developed than that of the Ludlow rocks, constituting several ellipsoidal masses near the town of Dudley, which have been long worked and extensively known among collectors, from the number and beauty of their organic remains. Hence the rock has been usually termed the "Dudley limestone." As, however, it was impossible to have ascertained in this district the relative age of these rocks, their different members being independently in contact with the coal measures, the nomenclature of the Silurian system already selected is adhered to, because in Shropshire the Wenlock limestone, in its fullest standard, rises out regularly from beneath the Ludlow rocks, and the latter passing beneath the old red sandstone and carboniferous limestone (both of which are wanting at Dudley) complete the proofs required. The author, therefore, entreats geologists not to employ the

* There is one spot, however, within the author's knowledge where the underground works reached a thick mass of red shale or marl *beneath* the coal-field; but the works having been long abandoned, no correct knowledge of these red rocks can be now obtained.

term Dudley limestone, except as the synonym of Wenlock, with which he proceeds to show its lithological and geological identity. This limestone is described in detail at the Castle Hill, Wren's Nest, and Hurst Hill, in all of which it forms ellipsoidal elevated masses, 500 to 650 feet high, protruding through the coal measures in lines parallel to similarly shaped masses of Ludlow rock at Sedgely, &c.; *i. e.*, tending from 10° E. of N., to 10° W. of S. Two strong bands of limestone occur in these hills, overlaid and separated from each other by shale, charged with numerous small concretions of impure limestone, the "bavin" of the workmen. The limestone having been quarried out from these bands, which have been raised up from a common centre, and disposed with a quâquâversal dip at high angles, it is evident that the hills themselves would ere now have been demolished, had they been composed throughout of calcareous masses of equal purity; but the "bavin" or refuse composes the framework of these perforated hills, and preserves their outline. The Wenlock shale, or underlying part of the formation, constitutes the nucleus of the Wren's Nest, the largest and most perfect of these ellipsoids, and of this the author gives a detailed plan. These ellipsoids usually feather off at one extremity with a broken-down margin, and thus complete their resemblance in physical features to ancient craters of eruption.* The greatest superficial extent of the Wenlock formation is in the neighbourhood of Walsall, where it rises both in dome-shaped masses and in rectilinear ridges, running from S.S.W. to N.N.E., parallel to the axis of the Wolverhampton coal-field, of which one of these ridges forms the eastern boundary, the limestone plunging beneath the coal-field at a rapid angle. The other ridge is continuous with the new red sandstone of the Bar-beacon, and is known as the Hey Head lime. In the Dudley, or ten-yard coal tract, few works have yet proceeded downwards beneath the lower coals, and hence the subjacent Silurian rocks are little known to the miners. A remarkable and accidental discovery of a mass of limestone took place recently, near Dudley Port, on the rise side of a great fault, which bounds the downcast of the coal, called "Dudley Trough." Having worked out the coal on the upcast side, a shaft was sunk in and upon the southern side of this fault, when, at a depth of 208 yards, and about 100 yards below the exhausted coal strata, a mass of limestone was met with, which proved to be near seven yards thick, and of very good crystalline quality. Being found to extend in a form more or less horizontal, extensive works were promptly opened in it for the extraction of a rock so precious in the heart of the coal-field. When the author visited it, a considerable cavity had been formed, in which no trace of moisture was discernible, whilst it was known that copious streams of water were flowing in the coal measures overhead. He accounts for this mass of limestone being hermetically excluded from the per-

* See account of Valley of Woolhope for similar phenomena on a larger scale, and with a greater number of concentric and enveloping formations.—*Proceedings Geol. Soc.*, vol. ii., p. 15.

colation of water, by the impervious nature of the Silurian shale which separates the coal measures from the limestone, and by the shafts being sunk in the fault itself, which, like other lines of fissure, is filled up with clay and other materials, so closely compacted as to form complete dams to water. At the north-western edge of the subterranean excavation, the fault was stripped, and the materials of which it is composed having thinned out, the limestone was found in contact with a bed of coal, the edges of which appeared *bent*, both the *coal and the limestone* having a slickensides polish. By boring through the limestone, a second calcareous stratum was found, thus completing the proofs of identity between this underground mass and that which rises to the surface in the hills of Dudley Castle and the Wren's Nest.

In the northern or Wolverhampton field, where the whole of the coal measures, even to beneath the lowest beds of ironstone, (the *blue flats*), are traversed by shafts not exceeding 120 yards in depth, the field has been proved at several points to rest on shale and impure limestone, the equivalents of the Ludlow and Wenlock formations. For lists of the fossils in this group of Upper Silurian rocks, the author refers to previous memoirs, announcing that more perfect lists will shortly be laid before the public in his large work upon the Silurian system.

3. *Lickey Quartz rock, Caradoc sandstone, (Lower Silurian rocks).*—Dr. Buckland first called the attention of geologists to the Lickey quartz rock;* and, showing that it had been one of the principal magazines of the quartz pebbles in the new red sandstone and diluvium of the southern counties, he further compared it with certain rocks *in situ* in the neighbourhood of the Wrekin. The Rev. J. Yates has also clearly described the lithological structure of this rock, and has briefly touched upon some of its fossils.† Mr. Murchison undertakes to prove the true geological position of these rocks. He shows that they lie in the direct prolongation of the Silurian rocks of Dudley, and that, being partially flanked and covered by thin patches of coal, they emerge through a surrounding area of the lower new red sandstone and calcareous red conglomerate (described in previous memoirs). Unlike, however, the succession in the Dudley field, there are here no traces of the Ludlow rock and Aymestrey limestone. Nor are there masses of any size of the Wenlock limestone; but shreds only of the shale or lower part of this formation, with some of its well-recognised fossils (*Colmers*).

The lower Silurian rocks rise from beneath the Wenlock shale in thin courses of bastard limestone, alternating with red and green courses of sandstone and shale, the equivalents of those bands which, at various places in Shropshire and at Woolhope in Herefordshire, constitute the top of the formation of Caradoc sand-

* *Transactions Geol. Soc.*, 1st Series, vol. v., p. 507.

† *Transactions Geol. Soc.*, 2nd Series, vol. ii., p. 137.

stones. Like these, they are here underlaid by flag-like sandstones, sometimes rather more argillaceous and approaching to clay slate, the whole passing down into silicious sandstones, both thick and thin bedded. In the latter are casts of several fossils of the Caradoc formation, such as *Pentameri* of two species, and corals peculiar to it. These fossiliferous strata are well exposed on the eastern side of the hills by recent cuttings, where the new road from Bromsgrove to Birmingham traverses the ridge. The ridge itself, however, consists essentially of quartz rock, which the author shows is nothing more than altered Caradoc sandstone, precisely analogous to that which he has on former occasions pointed out on the flanks of Caer Caradoc, the Wrekin, Stiper Stones, &c. In those districts the passage from a fossiliferous sandstone to a pure quartz rock has been accounted for by the latter being in absolute contact with eruptive masses of igneous origin; and here it is suggested that the same cause may have operated, though the contact is not visible, because the line of quartz rock is precisely upon the prolongation of the trappean axis of the Rowley Hills, whilst the southern end of the parallel outburst of the Clent Hills is but little distant. Notwithstanding their highly altered condition, it is shown that all the quartz rocks throughout this ridge of low hills are uniformly *stratified*, the dip being either to the E.N.E. or W.S.W., *i. e.* at right angles to the direction; and the parallelopipedal fragments into which the rock breaks are shown to be produced by fissures more or less at right angles to the planes of stratification; these fissures being so numerous where the mass is much altered, as almost to obscure the true laminæ of deposit.

4. *Trap*.—The composition and characters of the trap rocks and basaltic masses of the Rowley Hills are first described, together with the manner in which they are supposed to rise through and cut off the coal upon their flanks. Rocks of similar origin occur at various detached points to the west of Dudley, of which Barrow Hill is the principal, affording the most convincing proofs of the volcanic mass having burst through the carboniferous strata, since the latter are not only highly disturbed and broken, but fragments of coal and coal measures, in highly altered conditions, are found twisted up upon the sides, and even mixed with the trap itself. In the Wolverhampton or northern coal-field, the chief vent of eruption is at Pouk Hill, two miles west of Walsall, where the greenstone is arranged in fan-shaped columns. After pointing out distinct evidences of the intrusion of similar rocks at Bentley Forge and the Birch Hills, in some of the old open works near which the trap is seen to overlie the coal, the author gives various sections of subterranean works, which prove the existence of greenstone, in bands more or less horizontal. As these bands of trap have jagged edges, are of limited extent, of exceeding irregularity in thickness, and often produce great alteration upon the inclosing carbonaceous masses, the author has no hesitation in expressing his belief that they are not true beds, but simply wedges of injected matter which

have issued from central foci, and have been intruded laterally amid the coal strata ; an opinion formerly expressed by Mr. A. Aikin in an able memoir.*

Although these lateral masses of greenstone in the Wolverhampton field are of origin posterior to the accumulation of coal strata, the author does not deny that the tufaceous conglomerates of Hales Owen, which have a strong analogy in composition to a certain class of volcanic grits described in former memoirs, may have been formed contemporaneously with the carboniferous deposits.

The trap of the Clent Hills is then briefly described, and is shown to be identical with that of the Abberley Hills, also mentioned in previous memoirs.

5. *Principal lines of dislocation.*—The whole of this carboniferous tract has been upcast through a cover of new red sandstone, the lower members of which are frequently found to have been dislocated conformably with the inferior carbonaceous masses, proving (as formerly expressed by Mr. Murchison) that some of the greatest of these movements took place *subsequently* to the deposits of the red sandstone. In describing the faults along the boundary of the new red sandstone, he directs particular attention to that of Wolverhampton, where the coal measures dip slightly inwards from the line of fissure, along which they are contemporaneous with the *overlying* strata, a fact, perhaps, without parallel in this or the adjacent coal-fields (including Coalbrook Dale), the usual phenomena being that, however disrupted, the carbonaceous or upcast strata always incline outwards, as if they would pass eventually beneath the lower new red sandstone on their flanks. This exception is supposed to have been caused by the upheaving of a subjacent mass of Silurian or trap rocks close to the edge of the line of fault.

Having next described the effect of the great longitudinal faults produced by the upcast of the Wenlock limestone of Walsall, he shows that the subterranean mass at Dudley Port, is upon the same parallel, *i. e.* from N. E. to S. W., if not directly on the same line of fissure. This line of eruption is strongly marked on both edges of the northern half of the coal-field extending to Cannock Chase.

Another great axis of elevation which affects the Dudley field, diverges at a considerable angle from the former. It is prominently marked by the line of the Rowley Hills, and after concealment for a certain distance beneath the red sandstone to the S. of Hales Owen, re-appears in the ridge of the Lickey quartz rock. The lofty trappean ridge of the Clent Hills is parallel to this last-mentioned axis. It is further pointed out as remarkable that at the angle formed by the confluence of these diverging lines of elevation, the Silurian or fundamental rocks of the tract are raised in inflated ellipsoidal forms from common centres, the strata having a quâquâversal dip, in one case completing the outlines of a very perfect valley of elevation. The author infers that such curvatures are exactly what might be expected at the point of greatest flexure in the axis of the coal-field, where the volca-

* *Transactions Geol. Soc.*, 1st Series, vol. iii., p. 251.

nic matter, unable to find issue, has produced these inflated masses. There are numberless faults in this coal-field to which no reference is made, it being stated that much additional labour is required to give a complete history of them; but attention is called to the Birch Hill, Lanesfield, and Barrow Hill faults, which are the principal *transverse* faults, and which the author conceives may be explained upon the principles of the theory of Mr. Hopkins, or as cross fractures which have resulted from elevation of the coal-field *en masse*.

The memoir concludes with referring to the importance of one of the problems to which the author has been directing public attention during the last few years, viz., the probable extension of carboniferous tracts of the central counties beneath the *surrounding* new red sandstone; and he rejoices that the deductions which necessarily follow from his observations in this and the adjacent coal-fields, have recently been so ably supported by the masterly observations of Mr. Prestwich upon Coalbrook Dale, with whose opinions he entirely coincides.

The quantity, therefore, of unwrought coal beneath the new red sandstone of Shropshire, Worcestershire, Staffordshire, &c., though previously omitted in statistical data, must form an element in all calculations concerning the probable duration of the carboniferous wealth of the empire.

NOTES OF A BOTANIST.

MEDICINAL PLANTS APPLIED TO VEGETATION.

THERE is an expression used by Gardeners; namely, that "plants draw up plants," which would seem to indicate that plants do reciprocally affect each other, and that the fact is admitted. A gentleman once told me that a choice exotic, exposed *sub die*, flowered in winter, and though surprised by frost, suffered no injury; but this resistance he attributed to a *dose of brandy* which he administered to the plant! Be this as it may, there is one extraordinary fact which I have verified by direct experiment: I had read somewhere of the sanative or healing effects of *Chamomile* on some particular plants; but I confess I treated the statement as fanciful. The remarkable effects of the revivification of a plant, apparently dying, by placing two small pots of *Chamomile* beneath its branches, and pointed out to me in a gentleman's garden at Leicester, induced me to apply the curious remedy to several plants, as China Roses, a shrubby *Calceolaria* and

Malva, &c., all sickly and apparently dying ; I however succeeded in restoring every one of them to health and vigour. It is also a very curious circumstance that the Chamomile is materially affected, and suffers in its turn ; indeed generally dies. Some systematic action supervenes, and the question is altogether one, not merely curious in itself, but promises a new field of observation. How far other odoriferous or medicinal herbs, as Feverfew, Sage, Tansy, &c., may affect particular plants, it would certainly be interesting to inquire.

PLANTS SOMETIMES PLANT THEIR OWN SEEDS.

This is emphatically the case with the *Arachis hypogæa*, or “ground nut.” When the seed is fully formed, and partly mature, the branches which clutch the seed-vessels begin to curve toward the earth ; and in process of time the pod disappears, having been forced into the earth by the plant, where it lies buried, there to vegetate at a depth of about one to two inches. This plant, therefore, provides for its perpetuity in a singular manner ; the offspring is kept at home, and not suffered to wander vagabond, or the seeds become like other seeds, “as a rolling thing before the whirlwind.” The chances of the breeze are, in this case, deprived of their prey. I have watched this curious provision in the *Arachis hypogæa* with much interest. In the *Nasturtium* something similar may be observed : the spiral coils contiguous to the seeds seem concerned in the office of immuring them, which may occasionally be noticed to penetrate a sandy soil. This phenomenon, however, is more apparent in the *Cyclamen*, where the seeds will often disappear about the period of their maturity, the plant having hidden them in the earth, and the coils may be sometimes observed to form a complete plexus or sheath round the seed-pod.

PLANTS SOMETIMES WATER THEIR OWN ROOTS.

The most remarkable example of this extraordinary phenomenon, occurs in the Raining or Fountain Tree, or the *Spartium nubigenum*? in Ferro, one of the Canary Islands, forming the only source of water in the whole Island, and at which living stream all are supplied, “themselves, their little ones, and their cattle.” The water is dispensed to the inhabitants by the insular authorities. In this case, the atmospheric aqueous vapour is condensed by the branches and foliage, and trickles from them into the excavation at the base of the tree, said to be allied to the *Laurus indica*. Of the same description is the *Cobea pluviosa* of the American Continent, and another in the same hemisphere, of which we have only an imperfect account, but said on the slightest touch to emit a copious shower.

There are other plants, however, which are supplied with a distillatory appara-

tus connected with their organization, for they are true alembics. The stem of a particular kind of Bamboo, and also of a *Cissus*, or wild Vine, have been found charged with limpid and wholesome water, grateful to the weary and thirsty traveller. In these last, it is obvious the liquid is an elaboration of the plant. This, too, is the case with the *Agapanthus umbellatus*, or African Lily, which often distils water from its gracefully pendant leaves; and in one instance this distillation was so copious during the night, as nearly to destroy a work-box, accidentally left beneath its foliage: hence the intention is obviously to enable the plant to water its own roots. It belongs to the parched and sandy desert of Africa. The *Calla æthiopica* is another instance of the same kind: it is a native of the Cape. We almost esteem it as a half-aquatic; and yet it is found a denizen of the desert—its natal soil an arid sand. I am informed, however, that an individual who communicated the fact, and brought a magnificent specimen to this country, which I have seen, has found this plant where the ground around it was as wet as if it had been saturated with a heavy dew or a gentle shower of rain. The *Calla æthiopica*, like its congener, the *Agapanthus umbellatus*, distils water from the tips of its leaves, and in both cases the process takes place during the night.

Not the least singular among the phenomena of the vegetation of the desert, is the existence of *succulent* plants; precisely where we should least of all expect to find them; such as the *Cactuses*, *Mesembryantheums*, and the *Stapelias*; the last of these being emphatically called “the Vegetable Camel.” The curious berry met with by Mr. Campbell, in the desert, full of limpid water, and which some little mice were observed to treasure up in their retreats, will also be remembered, and suggest a train of singular and useful reflections.

But the most curious of all is, certainly, the *Tillandsia*, or Water Withe, of Jamaica, belonging to the curious tribe of *Epiphytes*—dwellers on trees, though they do not live upon their kind, like parasites. The *Tillandsias* are associated in their port and habit with the *Bromelias* and *Bilbergias*. The *Tillandsia* has what may be called a hollow stem; it is, in fact, a tank or cistern, formed by the leaves which overlap each other in an imbricated arrangement, and in ordinary conditions of the atmosphere constitutes an envelope alike impervious to air and moisture. This tank catches and retains the condensed dews—very copious in tropical countries—or the early and latter rains, retaining the supply when that which falls upon the ground is promptly absorbed by the thirsty and porous soil. Here, then, is a living well where insects and birds may slake their thirst, and *quadrumana* and others among the *Scansores* may apply to as containing a *cool* and refreshing beverage. So far there is much to admire in the beneficent provision: but the tale of interest is not half unfolded. In Earl Fitzwilliam’s extensive conservatories, at Wentworth House, there were two plants of the *Tillandsia*, and being in different compartments were subjected to varied temperature. In the one, the temperature of the external atmosphere was 71° Fah., and in the other

8 degrees higher. I was surprised, however, as well as delighted to find that the temperature of the water in the "stem" in both cases was 68° Fah. It is obvious, therefore, that this *equable* temperature, of which the plant must necessarily partake, is maintained by the equal ratio of evaporation, which will necessarily correspond with the measure of temperature in the atmospheric medium. It is thus that the plant will possess a medium temperature amid the vicissitudes and transitions of a fluctuating clime; having a remarkable correspondence with that compensation by which the animal machine is enabled to maintain a temperature of 98°, whether traversing the snows of Lapland, or the sands of Nigritia. The overshadowing foliage of the tree, among the branches of which the *Tillandsia* takes up its abode, will contribute to the check of the cooling effects of radiation. There is, however, another fact, which I have *experimentally* ascertained, still more wonderful: as soon as the external air becomes dry and parched, the leaves, previously even air-tight at their junction, *relax and open*, and the water may be seen to trickle down the stem to moisten the roots. The *Tillandsia*, therefore, literally waters its own roots.

OPENING AND SHUTTING OF FLOWERS.

At first sight, these phenomena would appear perplexed and somewhat difficult of solution; but, in some cases at least, I have found that the question may be determined by experiments. The characteristic feature of the opening and shutting of the flower, is its dependence on *hygrometry*—the moisture or dryness of the atmosphere. Towards evening, the flowers of the *Ranunculus acris* and Daisy gradually close and droop. The *Anagallis arvensis* is specially sensible of the coming shower, and multitudes among the numerous tribes of vegetation obey the same law, and must be familiar to all,—for instance, the blossom of *Eschscholtzia californica*. If the common Everlastings, or the flowers of the *Xeranthemum lucidum*, or *proligerum*, the *Gnaphalium fœtidum*, or the shrubby *Gnaphaliums* of the Cape, the *Ammobium alatum*, and others be plunged into cold water, they will slowly close; but when immersed into *hot* water, the petals instantaneously collapse. When the moisture evaporates in a dry and warm atmosphere, these flowers will as regularly open—experiments which I have often repeated with all of them; and so far the question seems sufficiently clear, namely, that the opening of the blossom is connected with a warm and dry state of the atmosphere, and its closure with a humid condition of the ambient air.

But "*non facies omnibus una;*" there are not only exceptions, but the cases are numerous. When many plants go to sleep, some there are just *awake*; of this description is the Evening Primrose and its nocturnal associates. The *Cereus grandiflora*, and *Stelis micrantha* are exotics of a kindred character. So that beings are wakeful during the ordinary season of repose, both in the animal and

vegetable kingdom. The physiology of these nocturnal flowers, it is evident, must be of a different character from those that unfold by day and repose at night. We have parallel phenomena which may be adverted to and adduced in illustration; and, as in the cases previously cited, may be made the subject of direct experiment. If an orbicular mass of the *Lycopodium circinale* be introduced into warm water it will unfold. The same thing occurs with the seed-vessel of the Fig-marigold (*Mesembryanthemum*) of the Cape when put in water. In the latter case, the seed-vessel expands, and the seeds are scattered when moistened with the tropical rains, and under circumstances which ensure the germination of the seeds. That curious plant, the Rose of Jericho, (*Hierochuntica anastatica*), which inhabits the borders of the wilderness or the desert, is constructed with a similar design, and presents analogous phenomena; for the same agency that shuts the flower of the *Xeranthemum*, and closes the imbricated calix of the *Centurea montana*, contrariwise unlocks its tiny branches. Accordingly, when it is introduced into warm water, a little above the junction of the branches with the stem, these branches gradually open,—another feature of the same beneficent arrangement apparent “in the length and breadth” of creation. The blast of the desert uproots the tiny plant, and flings it on the waves of the Nile or the Red Sea—the branches open and scatter the seeds that they previously enclosed on the surface of the stream, where they can alone germinate. In the meanwhile the withered plant is carried towards the Delta of the Nile, or the embouchure of the Red Sea; and having fulfilled its office and provided for the perpetuity of its kind, is engulfed in the ocean. The little seeds, floating hither and thither, bud and begin to grow; the wave at length lands them on the banks of the river, and a friendly breeze wafts them back to the soil of their ancestry, where they take root and spring up under the influence of tropical dews by which they are refreshed every night. I have a specimen of the Rose of Jericho, a great part of a century old, which has not lost its susceptibility of opening when introduced into warm water.

My next communications will embrace the subjects of “The Vital Principle in Plants,” “Monophology,” and “Spontaneous Production.”

J. MURRAY.

ON THE CIRCULATION IN THE INVERTEBRATA.

BY LANGSTON PARKER.

ALL animals possess a series of organs by which the fluids which are the product of digestion are distributed to the various parts of the body, to serve the purposes of nutrition and support. The sum of the actions of these organs is termed circulation; and the aggregate of parts by which it is performed, the vascular system. In the whole animal series the organs of circulation are infinitely varied, bearing a strict relation to the degree the animal holds in the scale of being, to its mode of life, and the number of internal organs it possesses. In the lower animals, we find their bodies everywhere impregnated with fluids which are not contained in distinct canals, but pervade every part. In a higher grade, the fluids are contained in distinct canals; in the course of these canals are situated, in certain classes, organs which receive and propel the circulating fluids, for the purpose of giving them an activity and force of movement not impressed upon them by their mere containing vessels. In vertebrate animals, these organs are termed hearts, and are variable in the four orders of vertebrate animals in their number, their situation, and mode of action. In this paper I shall notice the disposition of the vascular system, and the peculiarities of the circulation in the invertebrate classes of animals; tracing them from the simple Zöophyte through the numerous families of molluscous and articulated animals, which are comprehended in the system of Linneus, in the two grand classes of insects and worms, and by Cuvier in the three classes of articulata,* mollusca,† and radiata.‡

In the zoophytes there is no true circulating system. In the infusoria, polypes, and the inhabitants of corals and sponges, the uniform gelatinous granular mass of which the body is composed, is universally impregnated with fluids, and the functions of composition and decomposition, in the opinion of Carus, are performed by mere elective attraction and repulsion dependant on organic laws. In the medusæ,§ echinodermata||, and holothuriæ,¶ a rudimentary class of vessels has been described by Cuvier, which opening from the intestines, pass either towards the organs of respiration, or towards the surface of the body, which in these instances is probably a respiratory organ as the skin is, in some degree, in certain reptiles.

* Animals in which the general envelope of the body is divided, by transverse folds, into a certain number of rings.

† Animals with a soft contractile skin, destitute, as the articulata, of a skeleton.

‡ In which the organs of motion are disposed as radii round a centre.

§ Sea-blubber.

|| Prickly-skinned zoophytes; from ἰχθύος, a hedgehog, and δερμα, the skin.

¶ The Portuguese man of war.

In the acephalous* mollusca we have distinct organs of respiration, in the shape of rudimentary gills, and into these organs the veins returning the blood from the body enter. From the gills the blood is sent to the heart, and thence to the body at large, from whence it is again returned to the gills or organs of respiration. In the ascidiæ there is but one sac, which fulfils the office of a heart; in the teredo navalis there are four: the whole order of acephalous mollusca present great varieties in the number of hearts, as also in their form and position. The teredines alone have red blood, probably owing to the excessive stimulus required by the muscles which move the boring shells. In molluscous animals generally, the circulation is double; the blood passing through the gills, or lungs, or whatever name the respiratory organ may bear, as well as through the body. The passage of the blood through the body is assisted by a muscular heart placed in the course of the blood; the heart is generally single and aortic, that is, the single ventricle sends the blood to the body, after having received it from the organs of respiration: the circulation of fishes, on the contrary, is different, though performed by a single heart, which is termed pulmonary, because it receives the blood from the body and transmits it to the lungs. When the heart is single and sends the blood first to the lungs, it is termed pulmonary; when the fluid is transmitted first to the body, it is termed aortic. The veins in the cephalopodous† orders of mollusca have numerous glandular appendages, which appear to absorb fluids from the abdomen and pass them to the blood.

The annelidæ‡ have an arterial and venous circulation, consisting of a central dorsal vessel, which is the artery, and two lateral vessels, which are veins; there are no hearts placed in the course or centre of the circulation; the movement of the nutritive fluid is extremely slow, and performed either by the power of its containing vessels, or the pressure of the surrounding parts. In these animals the blood is uniformly red but does not exceed in temperature the medium in which they live. In the crustaceæ there is an elongated sac upon the dorsal surface of the body, which is the heart; this organ which receives the blood from the organs of respiration and propels it to the body, approaches in its appearance the dorsal vessel of insects; it is, in fact, merely a dilated vessel, of which the coats are thicker and more powerful than those of the other parts of the circulating system.

In the arachnidæ§ the circulation does not differ materially from the crustaceæ, the function is performed by a dorsal vessel, which is a rudimentary heart sending out blood vessels which are arteries, and receiving others which are veins.

* Mollusca without apparent head, which is concealed under the mantle in the centre of the body.

† In which the organs of motion, feet or tentaculæ, are supported by the head.

‡ Red-blooded worms.

§ The Spider genus, differing from the Insecta in many particulars, and forming the third class of articulated animals in the *Règne Animal*, of Cuvier.

If the back of the silk-worm be attentively examined, we shall observe upon it a dark coloured line continually in a state of oscillatory movement. This organ is analagous to the heart of other animals; and although much discussion has arisen among naturalists, with regard to its nature and use, the researches of Carus have established beyond doubt, that it is the central organ of the circulation, and both sends out and receives fluids. Cuvier considered the dorsal vessel of insects as the mere rudiment or vestige of a heart, and supposed that nutrition was effected by mere imbibition, as in the lower orders of zoophytes. That a distinct passage of fluids from the dorsal vessel does, however, take place, is certain, from the microscopic researches of Carus, which were first made known to the German naturalists in 1826. The first observations of Carus were made upon the larva of the *Agrion Puella*;* subsequently upon that of the *Ephemera Vulgata*, and at length upon many insects, both in the larva and imago state. In the first mentioned insect which swims with great velocity by means of three vertical laminæ attached to the caudal extremity of the body, and in which there are at first no traces even of the rudiments of wings, Professor Carus found the blood entering by single globules from the dorsal vessel into the caudal laminæ, passing through them and returning again to the central organ of the circulation. These laminæ are composed of a granular substance (resembling boiled sago) enveloped by folds of the common covering of the body. Into this granular substance the blood passes by single globules, which are not contained in distinct vessels, but form for themselves a passage through the homogeneous structure of the body. The path or channel thus formed in the midst of the granular substance is perfectly transparent; its sides are not strictly defined, nor formed by any thing like the coats of a vessel. This extra vascular circulation in the permanent state in insects, is found to exist in the embryo state, at the first commencement of organization, in many of the higher classes of animals; thus the first appearance of circulation in the incubated egg is the movement of a few red globules at points separate from each other, when, as yet, no vessels are formed.† In the aquatic "*ephemera vulgata*," the circulation is distinctly visible, with the microscope, in the three last segments of the body, in the upper phalanges of the legs, in the head, and in the posterior roots of the antennæ; it consists, as in the *Agrion Puella*, of two streams, an excurrent and a returning one; the blood passing through the various parts of the granular substance of the body, unconfined in vessels resembling either arteries or veins. In 1827, M. Carus discovered the circulation in the fully-developed insect, and subsequently Ehrenberg and Hemprich, travellers in Africa, have observed similar currents of blood in the wings of a Mantis.

* A species of Dragon-fly.

† For a full and most interesting account of the formation of the ovum in various animals, and the development of its several structures, see Breschet's translation into French of the German work of Baer—*Sur la Formation de l'Œuf*. Paris, 1829.

In reviewing, for a moment, the disposition of the organs of circulation in those classes of invertebrate animals we have noticed, we shall find the confirmation of a law in the formation of the internal organs of animals which has been noticed and promulgated by Serres, Geoffrey-St.-Hilaire, and Meckel; viz., that the various degrees of development which an animal, high in the scale of being, passes through from the first moment of conception to a period of full maturity, correspond to the permanent states of development in the lower grades of the animal series. Thus, in relation to the vascular system, we find at first but one system of vessels in the embryo. This condition of the vascular system resembles the perfect state of these organs in the medusæ and other zoophytes which have but one system of vessels; and the resemblance is the more striking, since in both instances, the vessels are not distinct from the general mass of the body. At a more advanced stage of development, the central organ of the circulation presents a mere dilated oblong canal, hardly possessing muscularity. In this stage we have the analogy with the greater part of the annelidæ, or red-blooded worms, where the heart is a mere dilated tube. In the arachnidæ and some crustaceæ, the heart is a thin elongated sac, from the extremities of which the blood-vessels arise. In the primitive state of the development of the heart in higher animals, there exists but one dilatation, as in the arachnidæ and crustaceæ, when perfect. In a subsequent degree of development, where a second dilatation is produced by the separation of the auricles, or receiving cavities of the heart, from the general system of veins returning the blood, we have the analogy of the embryo state of the higher animals with the perfect formation of the mollusca, fish, and the lowest orders of reptiles.

We shall trace the remaining analogies between these states, when speaking, in a subsequent paper, of the circulation in vertebrate animals. At present we have followed it as far as the invertebrate classes will permit us.

LEECHES.

It is stated by Mr. Gay, in a letter from Chili, that Leeches there inhabit the woods, and never are found in water. He has frequently had his legs wounded by them in traversing the country. Only one aquatic species is known to him at Valdivia, and one at Santiago. Another interesting fact indicated by him, is the tendency of reptiles in these southern regions to become viviparous; an anomaly which Mr. Gay has observed in a great number of Ophidians, Iguanas, and even in one species of Frog.

ON THE NESTS OF BIRDS.

It is stated by a correspondent, at page 68, in alluding to the Blackcap Fauvet (*Ficedula atricapilla*), that "touching the nest, or even looking at it, before the eggs are laid, almost invariably causes the birds to desert." I have, however, known several instances to the contrary. Last summer, seeing a bird of this species with a piece of wool between its mandibles, I traced it to the nest, which was situated in a wild, retired hedge, overgrown with brambles, and other shrubs of the Rose family (*Rosaceæ*). From this time I daily visited the nest, in which the eggs were deposited, one by one, notwithstanding my repeated visits; and I never found the birds absent. The male was on the eggs almost as frequently as his helpmate, and would allow me to come within two or three yards; but on a nearer approach would fly off to a neighbouring elm, with evident signs of impatience.

The same correspondent, at page 75, says—"The nest of the Coot is built in a bed of rushes or irises, in an open spot, several feet from the land, and is never situated, like that of the Gallinule, in a thick tuft of herbage, with a view to concealment, but may easily be discovered at a considerable distance." With this statement I cannot agree. I am well acquainted with the localities of the nests both of the Coot and of the Gallinule, and have found them generally in similar places. I have often found the nest of the Gallinule six or seven feet from the ground, in a bush, and that of the Coot in a similar situation; overhanging the water, but not so high up, and frequently *closely concealed* in the rushes and flags. Neither can I concur in the remark that "the young quit the nest immediately they are hatched." That this is often the case I do not doubt, as Selby, in his *British Ornithology*, states it from his own observation; but I have known them remain in the nest several days.

The most curious instance of eccentric nest building which has fallen under my observation, was that of an Ivy Wren's (*Anorthura troglodytes*) within the nest of a Chimney Swallow (*Hirundo garrula*, Blyth). The Wren's nest was, in all respects, as perfect as usual, with the sole difference of being encrusted by the procreant cradle of the Swallow. I shall be very glad if the readers of *The Naturalist* can bring forward any parallel instances. It is well known that several species of Falcon build in the nests of different species of Crows, and I have also heard of the Garden Tit (*Parus hortensis*) building in the prickly castle of the Common Pye (*Pica varia*): this latter circumstance is, I believe, very rare.

C. T. WOOD.

Campsall Hall, near Doncaster.

ON THE HABITS OF THE RING PIGEON (*COLUMBA*
PALUMBUS, LINN.)

By NEVILLE WOOD, Esq.*

OF the situation of the Ring Pigeon in the systematic arrangement, it will be sufficient, on the present occasion, to mention that it belongs to the third order of birds, *Rasores*, to the first family of this order (which, I believe, has not hitherto been divided into its five tribes), *Columbidæ*, and to the typical genus, *Columba*.

This beautiful bird is the largest of the British species, and, being indigenous and extremely abundant in this country, is perfectly familiar to the most superficial observer, under the various names of Wood Pigeon, Ring Dove, Stock Dove, &c.

It is a favourite among individuals who have no personal interest in agriculture, on account of its plaintive melancholy cooing, which sounds so delightful amid the thick groves, in a still summer's evening. But by the farmer it is proscribed as vermin, and destroyed with relentless pertinacity. Although common in every part of England, it abounds most in wooded districts, where it may be seen in flocks of hundreds, feeding during the day in turnip and rape fields, and retiring at night, in immense numbers, to thick and gloomy woods, always preferring those most distant from the habitations of man. It generally retires rather early to roost, most frequently selecting the same spot, which it flies over and around several times before settling on the trees. If disturbed when about to roost, it will fly off to a considerable distance, and return; but if scared away a second or a third time, it will select another wood for that night's repose (especially if the evening be far advanced), where it will sometimes continue for several nights together.

The flight of the Ring Pigeon is straight, rapid, smooth, and lofty, being effected by quickly-repeated strokes of the wings. In rising out of a thicket, however, or when surprised on its nest, its action is extremely heavy and clumsy until it has gained an open space and full command of its volar powers, when it glides along in a beautiful manner. Although well adapted for long-protracted flight, it does not commonly remain long on the wing—usually passing only from field to field, or from wood to wood. Indeed it is only when food becomes scarce in one district, and the species is thus compelled to seek its sustenance by a partial migration to another, that its wings are exercised for any length of time. In autumn and winter it is mostly met with in flocks; but early in the year they disperse in pairs over the country. When a pair of Ring Pigeons is started in a wood, especially if they have a nest, one of them invariably pursues a course diametrically opposite to that of the other; but after flying some little distance, they wheel

* Author of *British Song Birds*, &c., &c.

round, and meet at some well-known rendezvous, where the male often commences his delightful note as soon as he has settled.

This note, if I remember rightly, invariably consists of three strains, and a short note at the end. The whole ditty may be written thus : *coo cōō ; coo cōō coo ; coo cōō coo, coo coo ; cōō*. The stress is laid on the second syllable of each strain, which consists, musically speaking, of but one note. Delightful as the Ring Pigeon's love-song sounds at a distance, it is astonishing how rough and hoarse it becomes on a nearer approach. The Ring Pigeon begins to coo about the middle, or towards the end of February, when the flight of the male is diversified in a most curious manner. This mode of flight ceases as soon as the nest is commenced, or perhaps somewhat before.

The Ring Pigeon begins to build in March, and forms its nest of sticks and twigs, usually selecting the oldest and most brittle for the purpose. The sticks in the interior of the structure are somewhat smaller than those on the exterior. The shape of the nest is that of a platform, placed in the fork of a branch ; and though sometimes sufficiently substantial, at other times is so slightly constructed as to allow a practised eye to detect the eggs through the interstices. The nest is generally found near the tops of tall trees, particularly the fir, but I have observed it in nearly all the other common trees and shrubs which grow in sequestered woods. From its naturally shy habits, the Ring Pigeon is rarely known to build near houses ; but in places where the feathered tribes are not disturbed, I have met with instances of its breeding in the immediate neighbourhood of the abodes of men. Mr. Waterton pointed out a nest in an elm tree, within a few yards of Walton Hall, wherein both birds were sitting : so exceedingly tame will almost any bird become when unmolested. Last year a pair of Ring Pigeons built their nest in a laurel bush in the gardens at Foston Hall, Derbyshire, and hatched their young, though, for some reason I cannot explain, they deserted their progeny when about ten days old. This bird rears two or three broods in the season.

The eggs are never more than two,* one being laid two or three days after the other ; which causes a corresponding difference in their times of hatching. The eggs are oval, but nearly elliptical, of a pure white, and remarkably smooth. The first egg is hatched in sixteen days, the other in nineteen, and hence the reason of one of the young birds being invariably so much larger than the other. They are at first scantily provided with yellow down, but the feathers of the wings soon begin to shoot forth. In about three weeks they are ready to fly ; and in Derbyshire the peasants are accustomed, about this period, to tie them to the nest by one leg, in order to allow the parents to feed them until they have become

* The domestic Pigeon (which is descended from the Rock Pigeon, *C. livia*) also lays only two eggs ; but almost every extensive breeder of Pigeons must be aware that they will occasionally lay three. Instances of this have fallen under my own notice.

sufficiently large and plump to afford a good Sunday-dinner. They are then what epicures would call "excellent eating," but become very tough and tasteless after a few years have passed over their heads.

Persons little conversant with the habits of birds would climb up to every nest they saw, in order to ascertain whether or not it contained eggs or young; but if the slightest portion of the egg-shell is to be seen under the tree, neither will be found in the nest; should it, however, contain the latter, the droppings of the young birds are mostly to be seen, either outside the nest, or on the ground. After a few days, these become formed into a solid crust, which prevents the young from falling out, at the time when they begin to be restless. When we consider the flat formation of the nest, it becomes evident that without this "wonderful provision of Nature," the young birds would frequently be precipitated to the ground.

The impossibility of taming this bird and of domesticating it, in the manner of the Rock Pigeon, has been often mentioned, but I should imagine this statement has either been copied from other authorities, or the experiment has not been properly tried. Two years ago I reared a male Ring Pigeon from the time when it would have left the nest, always supplying it with green peas, beans, &c., until it was able to feed itself. When full grown, I turned it out and fed it with my other dovescot Pigeons, with which it constantly remained several months, except on one occasion, when it flew off to a considerable distance, but returned, to my surprise after an absence of a few hours. It found some difficulty in keeping up, on the wing, with the tame Pigeons (several of which were tumblers), as wild Pigeons are not accustomed to turn rapidly and frequently in the air. This bird sickened and died after I had possessed it six months, and I have not since had an opportunity of renewing the experiment; but doubt not it would succeed with common care.

The Ring Pigeon is an extremely handsome bird, the metallic hues of the head and neck contrasting finely with the white patches on either side of the neck. The feathers of the tail are considerably spread when the bird rises from the ground. The colours of the Ring Pigeon are so well known, that I shall not fatigue the readers of the *Naturalist* with a recital of them.

THE SWIFTFOOT.

EXTRACT OF A LETTER FROM JAMES WILSON, WOODVILLE, EDINBURGH.

I HAVE derived both pleasure and instruction from the perusal of the first number of *The Naturalist*, which contains some interesting facts accurately stated. From the favourable impression the work has produced upon me, I am

induced to offer an emendatory note to the first article, that on the Swiftfoot (*Cursorius isabellinus*), by Dr. Palmer. The author has followed an excellent plan in joining to his interesting sketch of that beautiful and graceful species a brief notice of the remainder of the genus. He errs, however, in supposing that these are only two in number, viz., the Coromandel Swiftfoot (*C. Asiaticus*) and the double-collared species (*C. bicinctus*). It is true that when M. Temminck, about sixteen years ago, published the second edition of his *Manuel d'Ornithologie*, the three birds above named were all that had been discovered of the genus in question. But several years have elapsed since Mr. Swainson (in his *Zoological Illustrations*, plate 106) figured and described a fourth species, under the name of *C. Temminckii*; and more recently the Dutch ornithologist himself has described a fifth species, under the name of *C. chalconotus* (*Planches Enlum.*, 268). Both of these are said to be natives of Western Africa. Thus the genus *Cursorius*, though more noted (as its name implies) for its running than its flying powers, occurs in countries not only widely distant from each other, but separated by an intermediate ocean of some thousand miles. In regard to the species which is figured in the first number, it might have been as well to have added, as a synonym, the title of *Cursorius Europæus*, which it bears in Mr. Latham's work (*Index. Orn.*, ii., 751). Dr. Palmer is, however, quite right in adopting, as the specific title, that of *isabellinus*, bestowed by Meyer (in his *Taschenbuch Deut.*, ii., 328). The appearance of the bird in question in our division of the globe is entirely casual, and the application of *Europæus* is most inapplicable to a species which never voluntarily abandons the warmer regions of more sunny climes. It has never been known to breed in Europe, and is so rare in Britain that one of the only three recorded captures was purchased, by Mr. Donovan, at the extraordinary price of *eighty-three guineas*. It has been only once taken in France, and once in Austria. Sig. Ranzani makes no mention of its having ever occurred in Italy. In Africa it is said to be more abundant in Abyssinia than elsewhere; and you may judge of the vast extent of its geographical distribution when I inform you that several specimens were received by Professor Jameson, some years ago, from the southern base of the Himmalah Mountains. The geographical relations, then, of the genus *Cursorius*, and its amount of species, I conceive to be as follows:—

1. *Cursorius isabellinus*. Africa and Asia : accidental in Europe.
2. *C. asiaticus*. Asia and Africa.
3. *C. bicinctus*. Africa.
4. *C. Temminckii*. Africa.
5. *C. chalconotus*. Africa.

Scarcely anything is known of the habits or natural history, properly so called, of any of these birds.

THE OSCILLARIA PHARAONIS.

[FROM A FOREIGN CORRESPONDENT].

M. DE BRIBISSON has communicated to the last meeting of the Academical Society of Falaise, an interesting account of a rare and but little known species of Alga—the *Oscillaria Pharaonis*. The coloured liquid formed by its prompt decomposition, presents a remarkable phenomenon, hitherto not sufficiently studied. The water in which this hydrophite has been deposited immediately after its being gathered, assumes a tinge of deep red, either ochreous or blood-coloured, when examined in a deep place or in an opaque vessel: but, on the contrary, if this water is placed between the eye and the light, in a thin diaphanous vessel, the colour assumes a beautiful indigo-blue tinge. A bottle filled with this liquid appears, in the sun, blue on one side and red on the other; thus it may be said that this liquid in decomposing the rays of light, only permits the blue rays to pass, and *reflects* the red only. White paper plunged in this liquid always takes an azure colour, and never a red tinge.

Bovy de St. Vincent, was the first naturalist who has described this singular hydrophite, in the *Dict. classique d' Histoire Naturelle*. He says of the *Oscillaria Pharaonis*, “we are indebted to the learned Mougeot for a knowledge of this singular species, which, in February and March of the year 1825, presented on the Lakes of Neufchatel and Morat, a phenomenon which recalled the idea of one of the plagues of Egypt, by which the waters were changed into blood. De Candolle published some account of this *Oscillaria*, proposing to call it *Oscillaria purpurea*—a name which would have created considerable confusion, since other *Oscillaria* possess a purple colour. The present species is not itself coloured; but possesses the property of giving out a coloured matter. Its filaments, whose structure has not yet been examined under a microscope, are excessively fine, at first invisible to the naked eye, but become visible by a careful separation in fluid, when they resemble minute undulated tufts, similar to those of the *Orgyrosa*, to which, also, the *Pharaonis* we examined presents another resemblance, that of being curled and shining, though the colour is quite different. A red tinge is given by it to paper. It appears that this *Oscillaria*, while living, was of a fine red colour, which, on dessication, passed into shades of lilac, more or less distinct.” De Bribisson remarks that the above description would lead us to imagine that the *Oscillaria* found in France was of a different species, if it were not that St. Vincent had given it from a dried specimen.

This *Oscillaria* is not of a red colour; its filaments are extremely delicate, being scarcely the hundredth part of a millimeter in diameter. They are long, of a shining blackish-green colour, often as if fasciculated; growing from a mucous base, thick, and yellowish. It grows in considerable tufts, sometimes more than

six inches in length, attached at the bottom of the water to stones or aquatic floating plants : examined under the microscope, these filaments present segments nearly as wide as they are long. After the emission of the colouring matter, the filaments become of a clear green ; a portion of the tube is emptied of the endochroma which filled it, forming masses of a certain consistence, often separated at small distances. In the empty portions, no traces of the segments can be distinguished on the external tube.

The singular coloration produced by this *Oscillaria* takes place almost instantly on its being gathered ; and it is impossible to transport any mass of it without their becoming immediately decomposed. If specimens preserving their original colour are required, they must be prepared on mica, or paper, in the water in which they were found at the moment of their being gathered. In all cases, on their becoming dried, it colours paper with blue zones ; it also exhales a sharp ammoniacal odour, very different from its congeners.

De Bribisson and Lenormand discovered this *Oscillaria* in the month of September, 1825, in the River Orne, near Falaise ; it reappeared in 1826, since which it was vainly sought for, when again this year it was abundantly found, in the month of July, in the same river.

Specimens have been forwarded to Mr. Duby, while publishing his *Botanicon Gallicum*, mentioning the phenomenon of coloration above stated, which his description does not correctly convey in these words :—*Filamentis : demum lilacis aquam purpurio et violaceo tingentibus.*

Other *Oscillariæ* impart the purple or blue tinge or water on their decomposition, but we have never observed the two shades existing at the same moment, as in the species now described.

MR. LECLENCHER has addressed de Blainville on the subject of the *Spirula*. He has succeeded in taking, on the Bar of Senegal, the animal inhabiting that mollusc, in a sufficiently perfect state to enable him, by a comparison with others possessing the mutilated parts, to complete a description of the whole. He has observed that the *Physalia* feed commonly upon these animals, which accounts for the number of their shells and the rarity of the animal in a living state. In addition to the description already given by naturalists, Mr. Leclencher adds, that, independent of the lateral lobes which terminate the animal, *two fins* may be distinguished, so placed that only a small portion of the shell is exposed. The eyes appear large, and enclosed in a cartilaginous orbit. The lower part of the neck presents the funnel shape usually seen in cephalopids.

REVIEWS.

A History of the Rarer Species of British Birds. By T. C. Eyton, Esq. Intended as a supplement to the History of British Birds by the late Thomas Bewick. Illustrated with Wood-cuts. Longman and Co., London. Three Parts, 8vo. 1836.

The Ornithologist's Text-Book. Being Reviews of Ornithological Works, with an Appendix containing Discussions on various Topics of Interest. By Neville Wood, Esq. Small 8vo., pp. 232. Parker, London. 1836.

*British Song Birds. Being popular Descriptions and Anecdotes of the Cho-
risters of the Groves.* By Neville Wood, Esq., &c. Small 8vo., pp. 408. Parker, London. 1836.

If the length and rapidity of the stride be at all commensurate with the stir which the science of Ornithology is, at present, making among us; if the quality of the information which they are destined to impart, bear anything like a fair proportion to the number and costliness of the works that are monthly, weekly, and almost daily, issuing from the press of Britain, the luckless birds will henceforth have but a very sorry time of it. Their domiciles and their haunts will, more than ever, be broken in upon by the reckless hand of the oological plunderer, and the prowling foot of the ornithological spy. The march of intellect will speedily achieve, among the feathered tribes, the work of ruin and dispersion which the march of population has long since begun. The Eagle will be finally driven from her eyrie in the precipice. There will no longer be a wilderness for the Owl, nor marsh for the "booming Bittern." Our hedge-rows will cease to be a place of secure deposit for the bright-blue eggs of the elegant little Dunnock: our eaves, to afford their wonted sanctuary to the faithful and confiding Swallow. Amid the rapidly increasing taste for ornithological pursuits on the one hand, and the daring encroachments of gas and steam and the ceaseless extension of human enterprize and dwellings on the other, our nocturnal and diurnal birds will seek in vain, throughout the land, for their congenial darkness and solitudes: and amid the universal rise of the waters of Science and the spring-tide of advancing population, the dove of Britain will find no spot whereon to rest her weary foot.

In addition to the three new works, whose titles are transcribed at the head of this Article, several others have already been published during the present year; many are in course of publication; and yet more have been announced. Of the works which have actually appeared since the commencement of 1836, the *Ra-*

pacious Birds, of Mac Gillivray, and the Second Edition of *the Feathered Tribes of the British Islands*, by Robert Mudie, are principally entitled to attention. The former of these is, more especially, a master-piece of ornithological description and research. We hope to see, ere long, other Orders of our British Birds delineated, and, in the true signification of the word, *illustrated*, by the same powerful, delicate, and experienced hand, and in language of the like commanding eloquence and perspicuity. Mr. Mac Gillivray's wood-cuts, representing the heads of the various species of Birds of prey, are uncommonly spirited and striking: his delineations of the internal structure of the Buzzard and the Owl, admirable studies for the ornithological inquirer, and models for the artist. Would that anything we can say, might induce Mr. Mudie, in the future editions of his deeply interesting work, to substitute for the painted figures, with which it is, at present, infested, some such accurate and impressive sketches of the external configuration, or internal anatomy, of the *Feathered Tribes*, as really adorn, because really illustrating, the felicitous and masterly descriptions of Mr. Mac Gillivray. To this list may be added, although not, strictly speaking, a British publication, the third volume of Audubon's fascinating *Ornithological Biography*.

The more important works, *in progress of publication* during the current year, are the magnificent and yet unrivalled *Birds of Europe* by Mr. Gould; Meyer's *Illustrations of British Birds*, a very respectable, although, assuredly, not a first-rate production; and the accurate and beautifully executed *British Oology*, of our friend, Hewitson. The intellectual and enterprising Mrs. Perrott has been so rudely,—we had almost said unrighteously—assailed by certain literary shrieks, in whose crania the organs of combativeness and destructiveness sadly predominate over those of benevolence and attachment to the softer sex, that we really apprehend she must have quitted, in disgust, the field of competition.* The most valuable and interesting periodicals, of which Ornithology constitutes an essential portion, are Partington's *British Cyclopædia of Natural History*; and the masterly *Cyclopædia of Anatomy and Physiology*, by Dr. Todd. The third and fourth numbers of the latter contain an article upon Birds (*Aves*) which must elevate its profound and accomplished author, Mr. Owen, to the first rank in the phalanx of living zoologists. The *Outlines of Comparative Anatomy*, by Dr. Grant—a third Part of which has recently appeared—will be found to supply information, alike luminous, accurate, and minute, upon the structure of the Bird-Class.

A new edition of the valuable *Ornithological Dictionary*, of Colonel Montagu, wherein the original structure will, doubtless, be cleared from the rubbish

* Since this sentence was written, we have received the distressing intelligence of the death of the accomplished and highly-gifted Mrs. Perrott, under circumstances of deep affliction.

and incongruities with which it has been encumbered and defaced by the impotent yet daring hand of Professor Rennie, and extended and adorned by the real discoveries and improvements of modern ornithological science ;—a new periodical on the *Smaller British Birds*, by Messrs. Blythe and Fowler, whose names alone constitute a sufficient pledge for the accuracy and value of such a book ; and—what is still better than all—a complete systematic work on British Ornithology, corresponding, in form and execution, with the *British Fishes*, of Yarrell, and the *British Quadrupeds*, of Bell,—may be selected as the most promising productions which, during the present year, have been announced for publication. Of the execution of the latter, we cherish the most sanguine expectations : we feel the deepest interest in its character and fate. Instead of the useless, although amusing, and frequently indelicate tail-pieces exhibited in the popular work of Bewick, we earnestly recommend the author of the projected volumes, whoever he be, to introduce cuts illustrative of either the internal or external peculiarities of structure, or the habits, of the individual bird under discussion. Ornithology will never attain the requisite precision to constitute a science until we have accurate delineations of the internal anatomy of almost every species of bird which traverses the desert, haunts the marsh or shore, or floats in air or water. In illustration of our views on this subject, we recur, with peculiar pleasure, to the elaborate and scientific volume of Mr. Mac Gillivray on the *Rapaces*.

The title of Mr. Eyton's supplementary work, to which we, at length, revert, sufficiently indicates its character and objects. The three Parts, of which it consists, exhibit pleasing, well-executed, and generally accurate representations on wood, of more than forty of the rarer species of British Birds. A few of these, however, it should seem, have been given in the last edition* of Bewick's interesting volumes ; and consequently ought not to have made their appearance here. The tail-pieces of Mr. Eyton are ordinarily quite as irrelevant to the subject which they follow, and, of course, quite as useless, as those of Bewick ; with but a very sorry sprinkling of the spirit and humour which characterize the execution, and, in some measure, expiate the sins, of their predecessors. The whole is terminated by a copious Catalogue, with a tolerably full and correct Synonymy, of British Birds.

Of the two productions of Mr. Neville Wood, both highly valuable and instructive, we greatly prefer the last. It is a delightful volume ; full of living por-

* It has generally been believed that the 1826 edition of Bewick's work is the last published. This was long our opinion ; and our reiterated inquiries, among the London and provincial bibliopoles, served only to confirm the erroneous impression. Another edition, with several additional figures of the rarer or newly-discovered British Birds, it now appears, came out in 1832. This edition, we naturally infer, must have been small, and speedily bought up ; as all our efforts to obtain a copy, or even the inspection of one, have, hitherto, been unavailing.

traits of our native Song-birds, evidently traced by the hand of a man of genius and an enthusiast,—an original and an indefatigable observer ; and truly refreshing to the spirit of the thorough-bred ornithologist, whom the stale and vapid performances of the hireling compiler have too frequently served only to nauseate and disgust. Deeply do we marvel how an individual, so little advanced in years, as Mr. Neville Wood really is, could have produced a work of which any naturalist, however aged or experienced, might well be proud ; and which all, who aspire to the character of a British ornithologist, must possess ; and, once possessing, will frequently peruse.

The *Text Book* is, on the whole, an odd and rambling work : yet, like many very odd people and odd things, there is, about it, a spirit of indescribable fascination and allurements. It consists, principally of short Reviews, with occasional extracts from them, of all the more important Ornithological works which have appeared, both in Britain and upon the continent, from the time of the celebrated Willughby, of Middleton, to the present day ; and will form an useful guide to the ornithological student in his selection of works of reference and illustration. Mr. Wood's criticisms on the writings and researches of other men, are generally correct, candid, and impartial. Sometimes, however, as in the cases of Professor Rennie and Mrs. Perrott, they are surely uttered in a tone of unmerited and unbecoming asperity : nor, in our opinion, has full justice been done to the exalted genius and labours of our illustrious RAY. On the other hand, Mr. Wood is occasionally lavish of his praises, where, from the worthless and contemptible character of the subject, eulogy is converted into the deepest satire. Unmerited praise, like a strong light thrown upon a crazy edifice, serves only to render more conspicuous the defects of that object which it seeks to illustrate. After all that Mr. Neville Wood has said, or can say, upon the subject, the trumpery work of Lewin on British birds will be trumpery still.

The *Second Part* of the *Text-book*, entitled “ Synopses of Systems,” contains elucidations of the Ornithological Systems of Willughby, Linneus, Brisson, Latham, Lacépède, Duméril, Meyer, Illiger, Temminck, Cuvier, Blainville, Vieillot, Vigors, Lattreille, Lesson, and Fleming, with the respective periods of their annunciation or development. It would require more time and examination than we can, at present, bestow upon the subject, to discuss their characteristic merits and defects. To the ornithological student, this portion of Mr. Wood's work will prove exceedingly acceptable and instructive. The remnant of the volume, under the head of “ *Supplement* ” is occupied with “ Hints for a new and complete work on General Ornithology ; and, as the title-page expresses it, “ discussions on various topics of interest.”

We cannot terminate these imperfect notices without formally and earnestly recommending an attentive perusal of the *Text-book*, and *Song Birds*, of Mr. Neville Wood to our ornithological readers : and we must add that he, who can

read the animated and glowing descriptions of the Garden Thrush and the Brake Nightingale, contained in the latter, without experiencing those emotions of pure and ineffable delight which the contemplation of the works and the wonders of Creation can alone or best awaken,—without catching a portion of the enthusiasm which inspires the ardent and highly-gifted author, and gives an indescribable charm to the productions of his pen,—has not a heart “instinct with Nature’s love;” and most assuredly possesses no real claim to the character of an Ornithologist.

The Naturalist’s Library. Conducted by Sir William Jardine, Bart., F.R.S.E., F.L.S., &c. Entomology. Vol. IV. British Moths, Sphinxes, &c. By James Duncan, M. W. S. pp. 268. Edinburgh, 1836.

“This volume presents to the Public the continuation and completion of the BRITISH LEPIDOPTERA, and is confined almost exclusively to the nocturnal portion of these beautiful and interesting objects of Creation; the former volume having embraced the natural history and illustration of the diurnal tribes. It is enriched with seventy-six figures of various species, most of them characteristic of distinct genera, accompanied in many instances with the Chrysalis and Caterpillar, the latter generally placed upon the plant on which it feeds; and they make in all ninety-nine figures. The two volumes are calculated to form a MANUAL OF BRITISH LEPIDOPTERA, complete in relation to the Diurnal and Crepuscular tribes, and presenting a considerable selection from the Nocturnal; they are illustrated by no fewer than *two hundred and forty-six figures*, drawn, engraved, and coloured from the natural objects with an accuracy which will bear comparison with the best works on the subject. The copiousness of pictorial illustration may be safely asserted to have no parallel, particularly when the small price of SIX SHILLINGS per volume is considered, and it could only be accomplished by the great number which are sold of this popular series, and the economy and care practised in every department of its details.”

The preceding is an extract from the *Advertisement* prefixed to the fourth volume of *Entomology*, of the NATURALIST’S LIBRARY: and we can conscientiously bear evidence to the accuracy of the statement, and the justice of the eulogy which it conveys. Rarely has it been our lot to peruse a more pleasing and instructive work. It is, moreover, got up in a stile of extraordinary neatness and elegance; and, even in this prolific age of cheap publications, we have seen nothing at all comparable, in moderation of price, with this. The figures of the various insects in their perfect and caterpillar states, are commonly drawn with great accuracy and spirit; and often coloured with equal truth and delicacy. To the justice of our eulogium in the last respect, there are, however, some exceptions. In the large Emerald Moth, *Hipparchus papilionarius*, Fig. 3, Plate xxvii., the “two

rows of whitish spots extending across both wings," and the "obscure crescent-shaped spot of a deeper green than the rest on the disk of each," are not distinctly expressed : and the naturally bright and gay colouring of the Gooseberry Moth, *Abraxas grossulariata*, Fig. 1, Plate xxviii., has been, by no means, successfully imitated. Yet these defects, of which we are surprized to find so small a number, and for the removal of which a little attention in the getting-up of the future editions will suffice, are amply atoned for by the general excellence and beauty of the volume. It is, in fine, a work with which every student of the British *Lepidoptera* should be conversant ; and to which even the veteran Entomologist may refer with pleasure and advantage.

The volume is headed by a very nicely engraved Portrait, and a Biographical Memoir, of Maria Sibilla Merian, the celebrated authoress of divers interesting works on Natural History ; of which the most important are the *Metamorphosis Insectorum Surinamensium*, Folio ; and *Erucarum Ortus, Alimentum et Paradoxa Metamorphosis*, etc., Quarto. She was born at Frankfort, 1647 ; and closed a life of ardent and unwearied devotion to the cause of natural science, at the age of 70. The countenance of this distinguished lady, as represented in an Engraving prefixed to her work on Caterpillars, strikingly confirms an observation which we have frequently made, that Nature loves to conceal her brightest gems in a disfigured or unsightly casket. By the magic touches of the British artist, however, the unprepossessing visage of Madame Merian has been transformed into a somewhat fair and goodly face. Would to Heaven that the moral delinquencies, which too frequently form the characteristic and the curse of genius, were as easy of reparation as its personal deformities and defects ! The hand and arm of the Lady, however, as delineated in the English portrait, are coarsely and clumsily fashioned ; and could never, we confidently assert, have been associated with a head of such fair dimensions, and a brain of such untiring energy, as Madame Merian evidently possessed.

GERMAN PERIODICALS.

We have received the first three Numbers of a Journal, in Quarto, entitled *Isis. Encyclopädische Zeitschrift, vorzüglich für Naturgeschichte, Vergleichende Anatomie und Physiologie* (The Isis, an Encyclopedian Journal of Natural History, Comparative Anatomy and Physiology) for the year 1836. The *First* and *Second* Numbers contain, each with three illustrative Engravings, a very long and important paper on Physiology, the matter of which it is impossible to condense within any reasonable limits. The *Third* is principally occupied by a Report of the Meeting of Naturalists at Stuttgard on the 18th of September, 1834. It is equally insusceptible of analysis or condensation.

The *Archiv für Naturgeschichte*, of which the first three monthly Numbers

for 1836 have, also, reached us, contains many interesting and important communications on various subjects connected with Natural History. Of those which strike us as most practically useful, we shall render an account in the next Number of the NATURALIST. The work is edited by Dr. Wiegmann; and published at Berlin. It is, at present, only in its second year. The three Numbers before us are enriched by eight very delicate, and apparently most accurate engravings.

EXTRACTS FROM THE FOREIGN SCIENTIFIC JOURNALS.

I.—ON THE SILEX OF PLANTS. Mr. G. A. Struves, of Dresden, has recently published a dissertation on the silex found in some species of plants. He assumes as a principle that *lime* is necessary to the animal kingdom, and *silex* to the vegetable; that certain localities are the more abundant in the different species according to the prevailing nature of the soil. Silex being almost insoluble, and not able to penetrate vegetables which are not aquatic, necessarily exists in larger proportions in those species circulating water. Mr. Struves concludes, from his experiments, that the silex discoverable in plants owes its presence to the action of the water absorbed by the plant, that it is not combined either with an acid or an alkali, and so far predominates over the other chemical components as to determine the form of plants.

The following are the numerical results of Struves's analyses:—

	<i>Silex.</i>	<i>Alum. Salts.</i>	<i>Calcareous.</i>	<i>Manganese.</i>
<i>Equisitum hyemale</i>	97,52	1,7	0,69	0,0
<i>Equisitum limosum</i>	94,85	0,99	1,57	1,69
<i>Equisitum arvense</i>	95,48	2,55	1,64	0,0
<i>Spongia lacustris</i>	94,66	1,77	0,99	2,0
<i>Calamus Rhodan</i> ?	99,20	0,0	0,54	0,0

We beg leave to observe that the plants above experimented upon all belong to the class *monocotyledon*, long known to secrete silex, if we may be allowed the expression; but Mr. Struves appears to think the same circumstance may be traced throughout the vegetable kingdom: in which we cannot concur, it being well known that a very small portion of silex can be detected in the *dicotyledonous* class. We also confess no small astonishment at finding the analysis of a *sponge* classed with vegetables, its animal claim having long since been clearly established. We have placed a query to *Calamus Rhodan*, not knowing the plant by that name.

2.—**ENORMOUS MASS OF MALACHITE.** In June, 1835, a mass of malachite was discovered in the mines of P. and A. Demidoff, at Nischnei-Tagilsk, in the district of Jekaterinburg, measuring 16,2 feet, *French measure*, in length, 7,5 in width, and 8,6 in height; it weighs, therefore, by admeasurement, 350 ponds of Russia, each pond being equal to rather more than 16 kilogrammes, French weight: making this enormous mass upwards of *five tons and a half*, English weight. No cracks or imperfections had been discovered so far as the examination had then been made. The largest block of Malachite previously discovered in Russia weighed 90 ponds: it was discovered in the mines of Furchaminoff, and is now deposited in the museum of the corps of miners, at St. Petersburg.

3.—**M. ENGELHART**, professor at Dorpt, appears to have been the first person to suggest, from geognostic appearances observable in the mountains of the Oural, that they contained diamonds. From the indications he furnished, the Russian government directed measures to be taken in order to ascertain that fact: they were not, however, attended with success. Count Polié, the proprietor of the land, on which is established gold and platinum works, was more fortunate; and the first Russian diamond was brought to light by his unwearied perseverance, at the period of M. de Humboldt's voyage in Asiatic Russia. The number of these precious stones found, only amounted to thirty-five; and the expense attending their discovery being immensely beyond their intrinsic value, it is more interesting in a scientific, than profitable in a commercial, point of view.

4.—**M. JACQUIN** has given an interesting paper on the pneumasticity of birds, which was read at the French Academy of Sciences, April 25th, 1836. He states that all the shoulder bones have their pneumatic perforations grouped round the scapular extremity, and receive air from the sub-scapular sac: it is transmitted to the bones of the fore-arm by the external cellular tissue, and even by the cavity of the humerus, from whence it is conveyed to the digits. An analogous arrangement exists for the inferior member, in which the cavities are always more extended as the species of bird possesses the greater powers of flight. The cervical vertebræ have numerous small perforations in the channel formed by the transverse apophyses: this conducts the air from the pectoral sac. The subcostal sacs furnish air in a similar manner to the ribs and dorsal vertebræ; and the sacral sacs to the vertebræ so called, and the basin. Air to the sternum is derived from the sternal sac, which sends it to the sternal apophyses of the ribs.

5.—**OSMYA BICOLOR**, (Latreille).—Mr. Bobineau Desvoidy, who is well known to the French naturalists, by his interesting researches respecting dipterous insects and Crustacea, particularly those of the neighbourhood of St. Sauveur, in

the department of Yonne, France, has recently furnished some details of the habits of the *Osmya Bicolor* and the *Osmya Helicicola*. These insects are nearly allied to the Bee, but form their nests in the deserted shells of the Snail ; he has divided them into two species, the first is only found nidified in the *Helix nemoralis*, and the second most frequently in the *Helix pomatia*. The *O. bicolor*, lays two eggs in each shell, the female egg being always placed uppermost ; above these are constructed three or four cells of sand, separated from each other by a membranous partition. The *Osmya helicicola* deposits ten or twelve eggs separated from each other by distinct partitions, each being provided with a magazine of honey ; but they do not wall in the different strata, either with sand or any other earthy matter placed above the domicile of their progeny. They sometimes form their nest in the *Helix nemoralis*, in which they lay several eggs, closing the entrance with a thick division formed of minute fragments of leaves, triturerated with the salivated excretion of the insect, and arranged in successive layers.

Mr. Desvoidy has also found in the nymphæ of those two species of *Osmya* a parasitical insect, which he, in the first instance, considered an Ichneumon, but has since determined it to be a pupivorous hymenoptera, of the genus *Eulophus*, hitherto undescribed ; he has, therefore, named them *Eulophus osmiarum*. These larvæ change into nymphæ without spinning a cocoon, or quitting the place of their birth.

Another insect is found inhabiting the vacant shells of Snails ; it is the *Sopyga punctata* : which passes its two stages of metamorphose in the cells of the *Osmya*, and are themselves sometimes tormented by the Ichneumon.

The same entomologist observes that the *Asylus diadema*—a species of insect hitherto only found in France, near Marseilles—is also met with at St. Sauveur, and may be classed with the enemies of the domestic Bee, which they seize with their feet, and bury in holes excavated for that purpose. This appears to be the only instance of dipterous insects being grave-diggers, which renders Mr. Desvoidy's discovery highly interesting. Of several examples of the *Asylus diadema* which this naturalist took in the act of carrying off their prey, all proved, on examination, to be females, and the Bees were doubtless burned to serve as a future provision for the larvæ of its ravisher.

Another interesting fact is mentioned of a species of dipterous insect, the *Conops auripes*, which torments the *Bombus hortorum*, as Mr. Desvoidy imagines, for the purpose of depositing its eggs on the surface, or between the annular segments, of that insect's body. The genus *Conops* are, at present, the only insects described as living *even in* the bodies of other insects which have attained an adult perfect state ; other analagous species only living on the larvæ, and still more generally on the nymphæ. Mr. Desvoidy adds that the apodous larva found *in* the body of a *Bombus*, and described by Messrs. Audouin and Lachat, most probably is a species of the genus *Conops*.



J. Murray & Co. Lith. London

The Common Kingfisher (Alcedo Ispida)







Argynnis Aglaia. var. 1

Melitaea Dia (undorside)

MELITÆA DIA.

ORDER.—LEPIDOPTERA.

FAMILY.—NYMPHALIDÆ.

PURPLE-UNDERWINGED FRITILLARY.

BY J. C. DALE, Esq.

THIS butterfly has, for some time past, held a situation amongst the *doubtful* natives of this kingdom, but has never been well authenticated till the captures made at Sutton Park (?), by Mr. Weaver, of the Museum of Birmingham, about ten or twelve years since.

The following is from Turton, p. 42, A.D. 1806 :—

“*Papilio Dia*, (marked as *British*).—*Wings*, fulvous, spotted with black; lower ones beneath, purple, the base with yellow and silvery spots and an obsolete silvery band in the middle.

“Inhabits Europe. Esp. tab. 16, f. 4. <

“*Lower Wings* with a row of six black dots towards the tip, the two middle ones slightly pupillate.

“*Larva*, grey, with alternate rows of white and feruginous spines.

“*Pupa*, yellowish, variegated with black.”

Stewart also gives it as *British*, nearly describes it the same as Turton, and says the caterpillar feeds on the *viola* (A. D. 1817, 2nd edition).

M. *Dia* was found in great numbers, on the east coast of Greenland, 71° N., by Mr. Scoresby.

ARGYNNIS AGLAIA, VAR.

The second figure in the subjoined plate is a variety of *A. Aglaia*, of which Mr. Sowerby gives the following specific characters: “Above, dull orange, with black marks; nineteen silver spots on the lower wing beneath.” Sowerby says, “The nineteen silver spots are very constant;” but he had seen no intermediate or other variety, of which there are now several, (one figured by Mr. Curtis, plate 290 of *British Entomology*.) Haworth also speaks of “*Alæ anticæ* lituris 4 nec, 5 costalibus utrinque, quarum 2 nec, 1 compositæ sunt;” but he did not think of the more or less confluence of spots.

The late Dr. Abbot took three specimens of the variety described by Haworth as *Charlotta* (*Caroletta*?), near Bedford, nearly all alike, and gave one to Mr. Haworth, and one to Mr. Sowerby, who figured it in his *British Miscellany*, plate 2; I bought the third in his collection, and have procured another taken near Peterborough, which represents on the *reverse* the characters of *Charlotta* on one

side of the inferior wings, and that of *Aglaia* on the other ; thereby *proving* it to be merely a variety : and Haworth mentions “ *Detecta Femina Olim D. Wilks, at ubi nescio.*”

Sir P. Walker had specimens in his possession, and I saw some large and fine *Aglaia* in the Isle of Arran, but could not take any. Mr. Bree, of Allesley, has figured *M. Dia*, and also two varieties of *A. Aglaia*, in Loudon, vol. 5, p. 749, fig. 122, as *Adippe* ? according to the opinion of Mr. Stephens ; but in his own (Mr. Bree's) opinion, *Aglaia*. Mr. Curtis has a very fine variety of *Adippe* taken, near Colchester, by Dr. Maclean, but it is very distinct from the above. I once found the larva of *Adippe* in the New Forest, June 1st, 1824. I have seen the suffusion of black spots in some species so powerful as to lose the genuine character so completely as to appear wholly black, instead of fulvous, with black spots (*Selene* for one).

ON THE APPLICATION OF THE PRINCIPLES OF INDUCTION TO THE INVESTIGATION OF THE VEGETABLE KINGDOM, AND THE INFERENCES IN RELATION TO NATURAL THEOLOGY.

BY ROBERT DICKSON, M.D., F.L.S.

LECTURER ON BOTANY AT ST. GEORGE'S HOSPITAL AND THE SCHOOL OF MEDICINE,
WEBB-STREET, LONDON.

THE members of the vegetable kingdom claim our regard, by ministering to more of the senses than any other objects of creation. The eye is delighted by their symmetry and elegance, as well as by their varied and brilliant hues—the touch is sometimes pleased by their smoothness or softness—the smell is regaled by their perfume—and the taste gratified by their flavour.

Yet it is not to be denied that, attractive though they be from thus ministering to the external senses of sight, smell, and taste, the degree to which these latter are capable of determining the qualities of plants, is vastly inferior to that of the animals which feed upon them. Animals, may, indeed, commit an error, and eat some poisonous plant ; but this is rather to be attributed to their being previously affected with some disease, by which the fine sense of smell has been lost, and the power of discrimination destroyed, than to an original deficiency of instinct : for, as a general rule, animals not only avoid particular plants of a poisonous kind, but whole tribes of plants possessed of noxious qualities. Neither oxen, horses, pigs, sheep, nor goats will eat a single solanaceous plant (Nightshade tribe) ex-

cept potatoës, all of which are more or less poisonous—though they devour readily the grasses, none of which, save one, have any unwholesome properties in a natural and healthy state. Other animals as decidedly avoid one tribe of plants and prefer others, as these just mentioned. In what way, then, is man to be placed in a condition equal, at least, if not superior to the animals over which he rules, in judging of the properties of plants, in respect to their safety or danger? Here, as in other cases, by exerting the intellectual faculties with which he is endowed—those inward senses, the possession and right application of which raise him to an immeasurable height above the beasts of the field. The astronomer foretells with the most unerring certainty, the return of every comet—those bodies which, till later times, were conceived to move through space in such eccentric orbits, as to have the appearance of random or chance visitants to our planetary system. This he effects by observations and calculations which have attained such a degree of accuracy, that it would seem as if the comet appeared in obedience to his will; whereas it only returns to a given point of the heavens in obedience to laws which emanate from the Creator of all things. Now, should any one undertake to foretell or determine what qualities or properties any newly discovered plant would be found to possess, it would seem to many to be presumptuous or paradoxical, and to some, impossible. Yet it is perfectly practicable by an application of the same principles of induction which guide the astronomer. Plants are not constructed at random, or independently of fixed and ascertainable principles. These furnish to the scientific botanist indications of the properties of a plant, not less trustworthy than those which conduct the observer of the heavens to conclusions which, on their first announcement are much more improbable—conclusions referring to masses of matter millions of miles distant from us, while the others relate to objects at our feet or in our hands. If this globe and all which it inherit be the production of the same Creative Being who formed the other planetary orbs, is it likely that different laws would be framed to influence the structure of its organized inhabitants from those which influence the whole? Certainly not. The chemist tells us that the most minute particles—atoms, as he terms them—of unorganized matter, enter into combinations with the particles of other substances in regular and uniform proportion. Aware of this law, he makes all his arrangements in accordance with it, and so accomplishes his objects at a vast saving of materials, and often of time, since he rarely encounters failure or disappointment requiring him to repeat his experiments or renew his operations. He has, besides, a certain index to errors or mistakes in every instance where he perceives a departure from the definite and ascertained proportions. Thus the chemist who investigates the separate particles of matter, and the astronomer who investigates the largest masses of unorganized matter, are alike guided by the power of numbers.

And is it probable that organized matter should be constructed with less re-

gard to number and proportion? Far from it. Though Plato of old called the Creator the Divine Geometrician, modern philosophers have been slow to observe the numberless instances of the operation of his adjusting mind, which all his works display. Indeed it has not been remarked in the animal kingdom till our own day, and the merit of observing it, promulgating, and establishing it is due to Mr. William Macleay, who, though young in years at the time of his discovery, was ripe in the power of penetration and spirit of arrangement. He has demonstrated that the whole animal kingdom is constructed in a series, which form circles of fives, (hence *quinary arrangement* as this is termed), five of the subordinate circles making one primary circle, the amount or number of these primary circles being also five.—(See Macleay, *Horæ Entomologicæ*).

The remark that *five* was a favourite number in nature, was made by Sir Thomas Brown, (see his *Quincunx*), in 1656, and he supported its correctness by numerous instances drawn from the vegetable kingdom. Its applicability to an entire section of that kingdom was not, however, observed or demonstrated till a much later date; and now it is a well-ascertained principle, that, of the three great sections into which plants may be divided, according to their internal structure and mode of growth, each has a predominating number, which is displayed in the portions which constitute the flower (in the vascular or flowering plants), and along with which prevailing number certain properties are invariably found to be conjoined. For instance, the first or lowest section of the vegetable kingdom consists of plants exclusively formed of cellular tissue, (hence called *cellular plants*); the prevailing number of the parts of which is two, or some regular multiple of two, as is best exemplified in the number of the teeth of the peristome of mosses, which are either, 4, 8, 16, 32, or 64. Such plants are remarkable, in general, for their freedom from any very active principle, and consequently scarcely any of them are poisonous: (fungi or mushrooms seem exceptions; but it is doubtful whether these singular productions belong to the vegetable kingdom). Hence though a few of them yield dyeing principles, the greater number of them are only employed as food for man or animals, and may, in most instances be fearlessly partaken of by any one in danger of perishing for want of other kinds of food.

The next section of the vegetable kingdom possesses vessels of different kinds, in addition to the cellular tissue of the former, and are characterized by a particular mode of growth—namely, by additions to the interior, (hence called *Endogens*), which accounts for the circumference of the stem when once formed, never varying or encreasing in diameter. These plants are at all times distinguishable by the manner in which the veins of the leaf run (*i. e.* always in parallel lines), and have the portions of the flower arranged in threes, or regular multiples of three. (See flowers of Crocus, Hyacinth, Lilies, or Tulips). This section contains plants which are scarcely more active than the former; and having neither bark nor

wood as parts of their structure, are destitute of the peculiar products of these parts. Hence it is mostly for food that such plants are valuable, and their roots (or rather rhizomata) and fruits or seeds are the parts chiefly employed for this purpose—as the arrow-root, the seeds of the cereal grains, wheat, rice, &c., and dates, cocoa-nuts, &c., are examples.

The remaining section of plants comprises those which grow by additions to the exterior (hence called Exogens), and which have the stems conical and branched, and the parts of the flower arranged in fives or regular multiple of five. (See flowers of Marvel of Peru, Pink, Rose, Potentilla, Apple, &c.). In these the leaves have the veins forming a net-work; they possess bark and a perfect woody structure, and consequently all the principles which are either formed or deposited in these. Among such plants are to be found the most active vegetable poisons, sources at once of injury and benefit to man; for while the savage employs them only to destroy his enemies, whether of the brute or human kind, the skilful and benevolent physician converts them into instruments of great, nay, of unspeakable, benefit to his suffering fellow-creatures.

So in the arts: does the dresser of leather need an agent to assist him in tanning, he seeks and finds it only in this section of the vegetable kingdom, as the *astringent* principle he requires is mostly lodged in the bark—as the Oak, the Willow, the Larch, and others which are employed for this purpose attest. Again; are fixed oils required for any of the various purposes to which they can be applied—they are, with one or two exceptions only, to be obtained from this section of the vegetable kingdom. All kinds of gums, of resins, and gum-resins, with scarcely any exceptions, are *exclusively supplied* by this section of plants.

It is unnecessary to add more examples to prove the advantage of proceeding in our examination of the vegetable kingdom, in reference to its uses to mankind, according to principles which have their foundation in the unalterable laws of nature, and therefore furnish the best and most certain guides. It cannot be doubted that the Author of nature intended these external marks and definite numbers, to be indices, or signs of internal properties; and instances might be given where a very slight, and, as some might think, unimportant difference of external structure, furnished a key to an important difference of chemical composition.

That the recognition of these principles will be productive in time of much utility may easily be imagined, but that is not the only or most essential object in noticing them at present; which is to intimate that throughout all nature a balancing, adjusting, and proportioning principle reigns, giving evidence of *the whole* being an emanation from *one* great Creative Being. Attention being once directed to the existence of such proofs, the observer will recognize them everywhere, and they will serve to illustrate to every mind, the wisdom displayed in the crea-

tion of the world by the Supreme Being, who, in the words of the son of Sirach, "created her, and saw her, and *numbered her*."

And thus voices, addressed to the ear of every rational believer, will be heard proceeding, not from the spheres only, but from every object of the visible universe, audibly declaring that "the hand which made them was divine."

THE NATURALIST ABROAD; OR, DAYS IN THE WOODS AND FIELDS:

INCLUDING INCIDENTAL BOTANICAL AND ENTOMOLOGICAL NOTICES.

BY EDWIN LEES, F.L.S. & F.E.S.L.

NO. I.—THE FIRST DAY OF SUMMER, AND THE LIBELLULIDÆ.

I HAVE often thought that a carefully constructed contemporaneous calendar of the appearance of birds and insects, and the flowering of wild or naturalized plants, would not only be of great use to the inquiring naturalist, but of extraordinary interest to the general lover of nature's wild scenes. That notices of the kind I allude to are scattered about in various works I am well aware, but they have seldom, if ever, been brought forward together, and their harmonies and associations fully traced. I think a plan of this kind peculiarly adapted for popular illustration; because, if the appearance of any flower synchronizes with the approach of its associate insect, and if the bird on airy wing, as it first meets the sunny gleam, tells us to look for the opening flower in its wonted haunt, then the images called up in the mind present an additional charm, and the various departments of nature's vast domain, instead of being kept isolated, are concatenated together, and one pursuit agreeably relieves another. Much more is effected by this combination of study than when the naturalist is bound down to one department only; for the botanist often unintentionally captures many insects with his flowering herbs, and the entomologist might, in like manner, gather many a botanical rarity while engaged in beating the bushes to replenish his collecting box. As nature herself delights in harmonious associations, so mankind are pleased with the combined array of all that her skill can produce, in the same way that a grand pictorial landscape, while true to the aerial outline of the distant mountains, traces, with the same fidelity, the lichened buttress and wild turret, dark in the cloudy shadow of the foreground.

To complete a plan similar to what I have here indicated would require many years of close and undivided observation to the subject, to say nothing of the active co-operation of others. At present, therefore, it would be immature to present it, but yet I think a few popular sketches might be roughly thrown off as studies which, if incomplete in their filling up, might not be altogether uninteresting, either to the scientific proficient or the enthusiastic and inquiring student of the most pleasing pursuit under the canopy of heaven, whether health, recreation, observation, or deep and close research, be the object in view. I shall, therefore, commence this series of out-door "pencilings by the way" with a sketch of

THE FIRST DAY OF SUMMER.

A light rain has fallen, and there is a haziness about the distant landscape ; but the deep blue hills, half obscured amid the rolling vapours, now throw off their dishabille, and the huge clouds roll lazily about as if uncertain of their next design, and indisposed for any exertion. But there will be no more rain, for the white, starry Chickweed has unfolded its stainless petals, the Swallows and Martins are darting high in the air, and the white Cabbage Butterfly (*Pontia brassicæ*) is careering to and fro.

We will proceed by the river, then, whose red waters now totally obscure the long green tresses and snowy blossoms of the Water Crowfoot (*Ranunculus pantothræ*, Dec.)* that so lately adorned the green shallows. And now that we have a mellowed gleam of sunshine through the light veil of the friendly clouds, what a pleasing scene presents itself to the eye. The rolling river, the green and golden meadows, the trees fresh in their leafy foliage, as if just created, the more distant groves passing into deep shadow, and the distant but noble line of mountain, neither blue nor green, but partaking of both, unscathed as yet by the fierce suns of maturer summer, diversified with rock and dingle, and yet so melting into the ærial distance as if formed of the unsubstantial vapours whose gigantic but evanescent masses overshadow it. But let us view the scene more in detail, while the note of the Cuckoo, whose hoarseness has not yet attacked her, sounds pleasingly upon the ear.

The Hawthorn has shed its snowy loveliness, except here and there, where, in retired recesses, a white bush of beauty, emblematical of lingering joys hoarded up to the last possible moment, still gleams amid the deep shadows of the over-bowering elms. The trees have now nearly attained their perfection of leafiness, and rustle their magnificent mantles in stately pride ; while the lighter green of

* This elegant plant, whose long stem quivering with the current, sometimes the length of twenty-four feet, appears to me quite distinct from *R. aquatilis*. The latter flowers in April, but *R. pantothræ* seldom before the first week in June, and, evanescent as a vapour, vanishes from the sight with the first rise of the waters.

the waving Poplar, the fresh viridescence of the Ash (whose old, beggarly, last years' tatters are, however, not quite concealed), and the olivaceous hue of the branching Walnut, bear witness to their later emergence into the glories of the scene. In the shrubbery, the Horse Chestnut (*Æsculus hippocastanum*) towers its digitated leaves, where a few of its fading blossoms still linger, though lost in the distance; but its glories are past; and the Laburnum, too, gorgeous in its chains of gold, is also rapidly going out. These, and a host of others, combine in the distant grove that extends itself like a dark wall, gloomy with verdure.

The meadows now claim our attention, where the yellow *Ranunculus* forms long curls of gold far among the green grass, and this golden tint is finely mellowed and heightened by the intervening red spikes of the tall sheep's sorrel. Here and there, too, the broad white disk of the great Daisy (*Chrysanthemum leucanthemum*) starts up, and the Cat's-ear and *Crepis* stretch out their yellow floscules in full glory, while the rich pink honeysuckle Clovers form a delightful contrast to the eye, and refresh the olfactory nerves with balmy fragrance. A crowd of minute yellow Trefoils, too, ramify amid the roots of the grass. On the bank of the river, where a minute tink of water descends through the spear grass in the deep trench it has worn for itself in the lapse of years, the Comfrey (*Symphytum officinale*) hangs its deep purple velvet bells, and the pink *Lychnis* (*L. flos-cuculi*) decorates the same vicinity with its ragged petals that announce the approach of the summer solstice. Here, too, a patch of blue Speedwell (*V. chamaedrys*) lingers, and the smaller azure-flowered *Veronica beccabunga* spreads its lengthened arms into the water itself, whence we have started the Grey Wag-tail from its nest. A band of gold stretches along the margin of the river, formed by the specious flowers of the wild Mustard; while the purple disk of a thistle occasionally diversifies it, or the white-powdered *Plantago media* stands conspicuously forth, like a liveried lacquey waiting for orders.

But the clouds are passing away, and the burning gleam of noon flashes upon the brightening scene. The Thrush is no longer heard quavering from amidst the oaks, and the noisy Chaffinch himself gives only an occasional twitter. A still brighter and hotter flash of radiance succeeds, and its energetic power calls forth the transcendent tribes of insects. The great Humble-bee booms in rapidly-shortening circles through the sounding air, and his compatriot, whose tail of red fire dashes along like a spark from a wheel, scarcely booms lower than he: another trumpeter sounds a shriller clangour as he rushes to the nectareous tube of the White Archangel, and a thousand minor buzzers give a voice to the air that steals over the distance with melodious effect. Now, rising over the grass, a host of black and brown *Cantharidæ* (*C. fusca et livida*), with red abdomens, appear conspicuous, while one of comparatively rarer occurrence, clothed in complete scarlet (*C. cardinalis*, Shaw), seems to take his stand as an officer to command them. These coleopterous insects, generally very numerous at this season

of the year are commonly called *soldiers*, and are often caught and sported with by children. The cockchaffers (*Melolontha vulgaris*) are not so numerous now as they have been, but one carelessly whirs by now and then, and the much smaller *Scarabæus solstitialis* now appears clustering round that half opened half destroyed Burnet-rose. A host of minuter insects, coleopterous and dipterous, animate the solar beams, and when the clouds intercept the bright rays, numbers may be observed resting on the leaves of plants, lurking in the broad shade of the trees, or even asleep in the flower-cups.

The lovely Cowslips, late so beautiful, have all faded away, except that one tall tuft deep in the shade, overshadowed by the Witch-elm and its hop-like clusters; and were not every primrose long ago fled, we might almost imagine that bright brimstone butterfly (*Gonepteryx Rhamni*) was a blossom of one wafted before the playful breeze. The sun gleams now without a veil before him, and a host of azure blue butterflies appear sporting along the topmost spikes of the grass. We are covered with gramineous farina in chasing them, but they rise up opening their blue wings on every side almost as numerous as the thousand Eyebrights (*Euphrasia officinalis*), whose modest beauties, though half hid, we see at every step; and vieing with the cærulean of the woolly-leaved Scorpion-grass.

But what numbers of *Aphides* cover the stems of the plants around us. Let us pause at this dock. Here the *Aphides* are wingless and black, and clothe the topmost stems of the plant like a mantlet of the ancient Romans, presenting nothing but their polished black armour to the attack of the enemy, so closely cling they to the plant. And well have they need; for a squadron of the small red Ants have found them out, and though they cannot carry them off yet they have found a prize which will save them the trouble of foraging for some time. See how they are passing over the *Aphids*, and now stopping and moving their antennæ about. They are regular lawyers, these Ants, and the poor *Aphides* their clients; they have extracted all they can from them already, and are urging them for another fee, nor will they leave them till nothing further is to be obtained. The fact is that the excrement of the *Aphis* being derived from the juice of the plant is very sweet and clammy, and the Ants are so fond of it, that they devour it as fast as it is produced by the *Aphides*, and the supply being insufficient for the demand, though the Ants do not exactly, like the boy in the fable, kill the goose to get all the eggs at once, yet, having devoured all the honey-dew the *Aphides* have manufactured, they tickle and incite them as much as possible to produce more, which they immediately devour. Whatever may be urged in favour of Ants, in general, as an industrious and provident race, but little praise is due to those I am now alluding to, who are evidently idle marauders, escaped from the restraints of legitimate authority, and are here living an idle and luxurious life, depending entirely upon the labours of others. I have often wondered how Ants were enabled to find their way up the labyrinthine passages of tall spinous Thistles,

and the tortuous stems of Brambles, to the positions of the various tribes of *Aphides* which they seem to do with perfect ease. Having once got there, however, they remain fixtures so long as the *Aphides* deposit their clammy sweet, without returning to their nests, as far as my observation goes. Even the large wood Ants (*Formica rufa*) attach themselves in bands in this singular manner wherever any huge Thistle has a colony of *Aphides* upon it; and there, perhaps, intoxicated with the luscious potion, they remain unconscious of any thing around them but the excitement arising from the continued drain from this living and ever-flowing bowl. Even when a plant thus circumstanced is gathered, the Ants seem very reluctant to forsake it, and unless compelled to leave, will still remain upon it, though they are conveyed hundreds of miles from their domicile. It is indeed stated by entomologists that Ants keep flocks of *Aphides* in their nests for the supply of the colony, "milking" them regularly for the use of the inhabitants. That they could keep them alive under ground for any length of time, I should think unlikely, though certainly on one occasion I beheld an army of small black Ants engaged most busily in removing all the *Aphides* from a Raspberry bush in a garden, an operation which they performed with considerable celerity. In general, however, I think they do not remove them from the plants to which they are attached, nor even relieve each other to carry home the delicious spoil, but settle down selfishly to a long luxurious debauch. The Ant, therefore, is not to be considered in the light of an enemy to the *Aphid*, since he not only does him no injury, but hangs upon and literally incites him to further depredations.

But a beautiful picture just opens by the water's edge. Behold where that forest of Club-rush (*Scirpus Sylvaticus*) in the marsh, exhibits its delicate white inflorescence; there the brilliant dark green Dragon Flies (*Agrion virgo*) are fluttering their purple wings. What tints can match with the golden green of the male, or the splendid emerald hue of the female, as it now rests upon the stem of the *Catabrosa aquatica*, or sparkles out in the sunbeams, contrasting with the rosy towering spikes of the great Bistort? Hosts of the *Agrion puella* too, are lightly balancing their fairy forms of the purest tints of sky blue over the cool waters, or resting upon the opening flower of the yellow flag (*Iris pseudacorus*); while the *Libellula depressa* with its fine slate blue abdomen, is rushing by on rapid wing, whirling against his rival, and chasing his yellow-tailed partner far over field and hedge, till resting for a moment from the fond pursuit on a dry hedge-stick, he seems, as the sun flashes upon his corselet, to be absolutely inhaling and drinking up the beams of light. But still more beauteous than all flutters the blue-green *Agrion virgo*, Fab., not mounting high in air, but softly gliding without an effort among the rushes and equiseti of that silver willowed covert by the river's brink, where the tall yellow Loosestrife is spreading out its golden corymbs. I love to behold them, for they come only with the established summer, and they sport in the most cool and delicious places, where the zephyr from the river

fans the rushes, and the ear is soothed with the murmur of the water. There they rest, hid in the recesses of the water plants. When I see them, the remembrance of *my* past summer days rushes upon me ; I think of the time when their purple fluttering wings and green brilliance first met my view, when I saw the world as a paradise created only for enjoyment, and knew not that, drilled by disappointment and commanded by care, I must take my place in the ranks, to fight with the difficulties and troubles which life in its onward progress too soon unfolded to my view.

But excessively beautiful as the Dragon-flies, or *Demoiselles*, as the French call them, confessedly are, and they are a favourite tribe with me, they are rapacious in the extreme, the very eagles of the insect world. They seem to flit along carelessly on easy wing above the flowery cinctured streams, as if bent only on contemplative enjoyment, or rise higher in air apparently to revel in the sunbeams ; but should any minuter insects appear in view, they dash upon them with the rapidity of the Falcon, their armed tarsi secures the victim, and their capacious maw soon encloses him from sight. One of our largest species, (*Anax imperator*, Leach), may sometimes be seen in the very hottest blaze of a summer's noon, assuming to himself the sovereignty of an entire pool, round which he wings his superb flight, offering instant battle to any intruder, and keeping the course clear for himself only, with the utmost pertinacity. But although thus matchless in their aerial movements, those whose wings remain horizontal while at rest, when prostrate on earth or in a low situation, have considerable difficulty at once to give sufficient power to the muscles that set them in motion ; and I have often observed the great variegated Dragon-fly (*Libellula varia*, Shaw) make many ineffectual efforts before it could rise from its position ; hence early in the morning they may be easily captured when found at rest. Once, however, on the wing, nothing can exceed the rapidity of their motion, and their able and diversified gyrations in the air. Now hovering low by the hedge side, a radiant beam glances upon their polished mail, and a jewelled blaze of sapphire and lapis lazuli flashes upon the eye—the next moment lost amid the labyrinthine foliage of the oak, they appear, vanish, and reappear, swift as meteors in the autumnal sky—now they are lost in the wood—again they hurry by with the velocity of an impelled arrow. Thus, in the fury of the chase they sometimes wander very wide from their usual haunts, dash over the recesses of the garden for insects, and are occasionally hurried out to sea. But mark, for a moment, the interesting attitude of that broad-backed yellow Dragon-fly who seems falling into the pool, so close does she approach to the edge of the water. It is the female of *Libellula depressa*. She recovers herself ere she has quite touched the water, and rearing up extends her abdomen and deposits an egg in the translucent element. On she flies repeating the curious process without rest, just touching the water with her abdomen, but never once overbalancing herself, while thus engaged on the wing in effecting the transposition of

her embryo burden to that element from which she herself once emerged, though its chill embrace would now involve her in destruction. Yet how fearlessly, how easily she accomplishes what might have been considered a difficult task ; not timorously clinging to a rush to perform the process, but circumvolitating the pool, depositing her eggs in the progress, and thus giving her offspring ample room and verge enough in the depths below for their future operations. And this bears the unmeaning name of instinct. But is not the *Libellula* while thus making provision for her offspring in an element where she herself would now perish, sensible that she formerly emerged from the water, and that her offspring must there for their allotted time undergo the same processes of development which she passed through, prior to being fitted to sport in air and perform the economy of her mature state? At all events the contemplation of an incident like this is not without a note of instruction in the wide extended field of natural theology.

The beautiful and elegant tribe of *Libellulidæ* were all included by Linneus in one genus, and, as remarked by Stephens, the Linnean character of one species is so comprehensive that it positively embraces no less than two genera (*Lestes*, Leach, and *Agrion*, Fab.), one containing three, and the other ten, indigenous species in its extensive grasp ! and the consequence has been that Latreille and other celebrated entomologists assert that the sexes unite pell-mell together, and that the varieties resulting therefrom are innumerable ; whereas, the fact is that these insects are as particular in their amours as any others, and the varieties are equally referrible to their proper species, the male usually, however, differing from the female in colour. This last circumstance has caused some confusion in the naming of species ; and to be accurate in the study of this tribe it is indispensable to observe them when in union. Fabricius subdivided the *Libellulidæ* into three genera, *Libellula*, *Æshna*, and *Agrion*, which have been generally retained by entomologists, though much extended by Dr. Leach. I shall, however, here adhere to the Fabrician arrangement, as sufficient for the present occasion, and perhaps a British example under each may be useful to the young inquirer. All the species of this tribe have two great lateral eyes, and three smaller ones or ocelli, situated on the vertex, antennæ minute and almost concealed, strong corneous mandibles, wings extended horizontally or meeting vertically above the back, reticulated in an admirably delicate manner, and with the tarsi three-jointed. The larvæ and chrysalides inhabit the water till the period of their ultimate metamorphosis, and bear a considerable resemblance in form to the perfect insect, but having only the rudiments of wings. They are remarkable for the singular construction of the piece which replaces the lower lip, covering the mandibles, maxillæ, and almost the whole under part of the head ; it has been compared to, and called by some, a mask. Having completed the initiatory period of their existence, the pupæ issue from the water, climb up the stems of reeds and other aquatic plants, and, divesting themselves of their old skins, prepare for the enjoy-

ment of sporting in another element with appendages previously hidden from view and undeveloped in their beauty.

I. *LIBELLULA*, *Fabricius*. The individuals of this genus have their wings extended horizontally when at rest. The head is globular, and the eyes very large and approximating. Two ocelli on each side a vesicular elevation on the vertex, and the anterior one much larger. *L. depressa* is a well-known species, generally very common in May and June, dispersed on the margins of ponds all over the country, and hence easy of capture. It never seems to diminish or indeed materially to increase its numbers, though it is recorded by Blumenbach, from Voight's *Neues Magazin*, that in the years 1806 and 1807 they appeared in great crowds in Thuringia and the Hartz. The abdomen of the male is of a fine blue slate colour, which he displays very conspicuously as he shoots along; that of the female is brownish yellow, with yellow spots on each side. Both are remarkable for the elegant black and orange markings at the bases of all the wings. *L. depressa* may be very frequently seen perched upon a dry hedge-stick in the hot sunshine, where he seems to be imbibing the solar rays, and darts off swift as an arrow if disturbed.

L. quadrimaculata, a much rarer species, of a light brown colour, with hairy thorax, is distinguished by two conspicuous brown spots on the costal nerves of each wing, with a broad scorched-like mark at the base of each of the posterior wings. *L. cancellata* is another fine species. *L. vulgatissimus*, brown, with yellow markings, may be met with in June about woods and hedges.

II. *ÆSHNA*, *Fab.* The *Æshnæ* resemble the *Libellulæ* in the position and bearing of their wings, and in the form of the head, but their two posterior ocelli are placed in a simple transverse elevation, in the form of a carina. M. Van der Hoeven lays some stress upon the cellulæ at the base of the anterior wings, being larger in *Æshnæ* than in *Libellulæ*, and horizontally shaped, instead of inversely triangular; while there is no difference between their anterior and posterior wings, which there always is in the latter. The abdomen is here narrow and elongated. *Æ. varia* is a splendid insect: his size, varied colours, rapacious habits, and rapid flight, justly entitling him to the appellation of an "emperor of the insect world." The thorax is marked with four broad greenish-yellow stripes, and the abdomen is beautifully variegated with green and yellow, on a brown ground. Wings four inches in expansion, iridescent. This species is very partial to the vicinity of woods, dashing with amazing velocity among the ramifications of the trees, while tints of dazzling splendour play on his resplendent armour as he shoots along. This insect flies later than most of his order, probably to catch the evening insects. Mr. Newman has placed the *Libellulidæ* in the centre of his septenary scheme of insect creation, as the type of Nature's perfection of skill and splendour in this division of animated life. "In this group," he observes, "we find the organs of sight, manducation, and locomotion carried to a greater degree of perfection than

we ever met with except in similar centres : like the king of birds, the Dragon-fly is unrivalled among his kind.”*

Æ. grandis,† (Lin. and Stephens), ranks here, a noble species, scarcely inferior in size to the preceding : thorax and abdomen auburn brown, with brown glazed wings. *Æ. annulata* (*Cordulegaster annulatus*, Leach) has the thorax jet black with yellow lines and the abdomen brown with a yellow transverse line in the middle, and two yellow spots on the side of each ringlet. I found a dead specimen of this insect lying on the beach at Fishguard, Pembrokeshire, this autumn.

III. AGRION, *Fab.* The Agriones differ from the other Libellulidæ in their wings being elevated when at rest, the head being transversal, and the eyes distant from each other. The ocelli are placed in a triangle, and the abdomen is cylindrical and linear. Perhaps in delicacy of form, silken splendour of attire, and elegance of veiny wing, they excel the other families of a tribe where elegance and splendour is the prevailing characteristic ; and hence the appellations of *Virgo*, *Puella*, and *Sponsa* have been poetically applied to them ; they have all, however, the predaceous habits of the tribe, but fly less swiftly, with hovering indecision, and vagabondizing mostly in low marshy situations by the sides of streams, ponds, and rivers, often reposing on aquatic plants, are very easily taken. Their larvæ feed in the water, but their bodies are more attenuated than those of their congeners with a long tail.

A. virgo (*Calepteryx virgo*, Leach) we have previously described as of singular beauty. The deep-blue of the thorax and abdomen, relieved by golden-green reflections, forms a splendid object. Wings without a real stigma, yellowish, with a deep purple stain in the centre. This is a social species, numerous squadrons being commonly seen sporting together on the reedy margins of rivers in June and July.

A. puella.—Another social species, very delicate in form, of a lovely blue, and abundant about rural ponds as soon as the spring is firmly established. Under this name Linneus placed, as varieties, several forms, very similar in shape and habit, but differing in colour. He imagined these supposed varieties intermixed with each other, which is not the case ; and they now, therefore, are justly named as species. *A. sanguineum*, *A. albicans*, *A. annulare*, *A. zonatus*, *A. rufescens*, &c., are all to be found in wet places and about pools, adding by the

* Newman's *Sphinxæ Vespiiformis*, p. 28.

† The term *grandis* seems to have been applied to several species of the *Libellulidæ*, remarkable for size and beauty ; and hence a confusion has arisen difficult to unravel without having the specimens of different authors before us. Linneus, in the last edition of the *Syst. Nat.*, does not mention the colour of the abdomen ; and some state it to be brown, and others spotted with green. *L. maculatissima*, of Stephens, was probably alluded to in the latter case.

beauty of their mazarine blue, sanguine green, and white tints, to the charms of those solitary spots, where, seated on the heath beneath the birchen shade, the tired Naturalist, while he rests his wearied frame, marks with pleasure the successive gleams of coloured light, as band after band of these bright creatures flutter about the pink *Polygoni* or sober brown shaggy and wiggly Bulrushes.

A. autumnalis (*Lestes autumnalis*, Leach) is a species that appears late in the year, with light-brown thorax and abdomen, and membranaceous wings marked with "an oblong-quadrate paralleliped stigma." Unlike its congeners, its inconspicuous colours render it an object of no attraction, and, coming with the close of summer amidst rains and falling leaves, its manners and habits have been little attended to or regarded. There is still much to be learned respecting this interesting tribe, both as regards their larva and perfect state; and he who would publish a monograph of the British Libellulidæ in English, with accurate figures of the whole, would be rendering a very acceptable service to entomological science, since I can refer to no English publication at present, for a description of all the species, though Mr. Stephens in his splendid work has much enlarged the *Agriones*.

But while we have been thus dilating upon the *Libellulidæ*, the sun shining forth with almost insufferable radiance, warns us that however congenial his heat may be to them, it is too powerful for us, and the shade of yonder oak coppice offers a grateful shelter. A spring over the brook, a crash upon the broad leaves of the *Tussillago*, and we are within it. How deliciously cool; while not a sound breaks the stillness, and not even a vagrant fly molests us. Alone in gloomy quietude *Paris quadrifolia* lurks, with her single sable berry surrounded by the green calyx; and springing up among the dead oak leaves the curious orchideous plant *Listera nidus-avis*, can at a little distance be scarcely distinguished from them, though now opening her singular brown dead-like flowers. On, now then, to inhale the thymy fragrance of the hill top, where the minute flesh-coloured and delicate blossoms of the *Ornithopus perpusillus* couch lowly on the earth, spreading out their curious legumes in imitation of the feet of birds, and where in long trailing spikes the dark purple Milkwort (*Polygala*) spreads out her winged petals, and the blue Argus butterfly wantons among the rising brakes, just unfolding their curled-up fronds. But the Pheasant has just risen with a loud whirl from the eggs she was sitting upon, and an alarmed gamekeeper who will know nothing of our "untaxed and undisputed game" is approaching. Perhaps on a future occasion, blue skies and sunny hours may urge us to be "abroad" again, gleaning delight amid the attractions of the woods and fields.

REMARKS ON THE PRESENT NOMENCLATURE OF BRITISH ORNITHOLOGY,

WITH A VIEW TO ITS REVISION AND CORRECTION.

BY THE REV. F. ORPEN MORRIS.

THERE is not, perhaps, any subject connected with ornithology on which so great a variety of opinions is entertained, as its nomenclature; and while all Naturalists admit that the evil should be remedied, there are scarce any two who can agree as to the course to be adopted to effect this object. One probable means of attaining the great end which we all have in view,—a *fixed* and *corrected* nomenclature of our native birds,—would be, by a deputation being appointed to meet together from various parts of the country, either at London, York, or Edinburgh, and consulting *pro* and *con* on the propriety of each name proposed or used—to establish it *finally*, or to erase it by common consent. But there is little probability—perhaps hardly any possibility—of this course being adopted: in the mean time the most reckless and gratuitous changes are prompted by the Naturalist's individual caprice. In briefly stating my own views upon this subject, as an humble individual among the multitude of ornithologists who are arising up all around us, it is far from my wish to cast any slur upon their opinions should I find it necessary to animadvert upon them. I am only desirous of breaking the ice for some one more capable than myself to cross the lake.

There are two classes of names in Natural History—generic and specific, with regard to which a difference of opinion has been, is, or may be entertained. Now, with respect to both of these, I will lay it down, *in limine*, as an absolute rule which is on no account to be deviated from, that, where alteration is *unnecessary*, it is unpardonable to alter; and that no feeling of vanity, whether felt for one's self or one's friend—no insufficient or inadequately explored ground of opinion—ought to have weight to induce any writer to change an already established name, constituted with sufficient reason. With this broad principle all will, probably, agree; but upon it there immediately arises the question, “What is a sufficient ground for alteration?” and this involves a previous question, “What is sufficient to establish a name so that it should not be altered?” Here it is that the difference of opinion begins to extend so widely; for scarcely any two Naturalists are agreed definitively on a single name. It is a singular fact that there is, probably, not a name (I mean among the better known and better investigated species, such, for example, as our British birds) which has not some one synonym at least, and most of them a great number: if, therefore, this mania is not checked, the evil will in time progressively extend to the whole catalogue of nature, and, as if her creatures were not already sufficiently varied and diversified, we shall increase

them to a tenfold number, "proceeding," as Mr. Burchell observes in *The Vicar of Wakefield*, "in a reciprocal duplicate ratio." One writer assigns a species to one genus, another to another, so that, *assuming*, for the sake of argument, that each is right, we shall ultimately have no distinction between genus and species—every species will comprise a genus, every genus will contain but one species; and thus one representative name would answer the purpose of two, with half the trouble and twice the simplicity.

With regard to generic names, Dr. Lindley says, "so impossible is it to construct generic names that will express the peculiarities of the species they represent, that I quite agree with those who think a good *unmeaning* name by far the best that can be constructed." What Dr. Lindley means by "a *good* unmeaning name" it is difficult to say; because, if the name be unmeaning, which he assumes, and in which he considers its excellence to consist, it would be well adapted for its purpose, provided it were not monstrous or ridiculous. If we admit the correctness of his opinion, which I shall discuss presently, the matter, as far as generic names are concerned, is settled at once; but if we leave this a matter of uncertainty or of choice, assuming his proposition as to the impossibility of constructing generic names which shall express the peculiarities of the species, we shall then have a difficulty to encounter with this class of names, which does not meet us with the latter, because then it might be no easy matter to determine whether alteration would be needed or not—in connection, I mean, with the fitness or unfitness of such names.

But it remains to be considered whether it is really better that the generic name should be unmeaning or not: and, first, it is evident that if a name can be selected whose meaning *can* express the peculiarities of the species, such a name is preferable to one which, having no meaning at all, can of course convey no information as to the characteristics of any individual contained under it. That it is possible for such names to be employed is manifest in the cases of genera which contain only one species; because, if a specific name can be chosen which will express the specific difference of that kind, nothing can be more easy than to express the same by some other tautologous word; or, if that is not practicable, it may be accomplished by the one name being expressed by a word of Latin, the other by a word of Greek, derivation. Again, even in the case of genera which contain more, or many more, species than one, I do not see, even here, what is *gained* by using a name which has no meaning; but rather on the contrary it appears to me that *something* is gained if the generic name be capable of expressing even a *part* of the peculiarities of its species; and I am inclined to believe that some generic name might be constructed to express even *all* of them, (without being of any immoderate length) although that is not indispensably necessary; because if part of the peculiarity is expressed by the specific name, and the other part (common, perhaps, to all the species) is expressed by the generic, the whole definition of

the bird may then be conveyed—so far, at least, as it is possible to do so briefly in any two compounded words. It need not be stated, that no generic name should be contradictory of the existing circumstances of any of its species.

But to pass on to the second class of names—the specific. In the first place, the last mentioned postulate is required also in their case, and if modern discoveries should prove an error in any existing name, that is quite sufficient reason for its alteration; at the same time all due deference should be paid to the original composer, and chief of all to Linneus; and if some portion of the original name can be retained by *alteration*, instead of an entirely new one being formed, it would in all cases, I should say, be desirable.

Secondly, the specific name should express, to the fullest possible extent, the peculiar characteristics of the bird; but if a name already existing is unobjectionable in other respects, and has no other fault than that of not conveying so clear a meaning as some other new name, I do not think that a sufficient reason for altering the original one.

Thirdly, the specific name should not be founded on a generic character; if it is, that is quite enough to authorize its alteration.

Fourthly, the same specific name should not be used twice in the same genus, nor indeed twice at all, supposing that to be possible, as I think it is; but this is a point which may admit of some doubt.

Fifthly, they ought to express some peculiarity distinct from that of any other species in the same genus; nor should they be derived from similarity of appearance to some other *species*, but rather from the habitat, food, or general appearance of the kind they represent.

Finally, I would urge that specific and generic names should be classical; and if any one think this a matter of minor importance, I would refer him to either of the classes in zoology, and then to determine whether the *unintelligible* barbarisms which will everywhere offend his eye and ear (if he has been at all used to more orthodox combinations) and the absolute jargon of such semi-græco-latino-anglio forms as there abound, do not call loudly for “reform.” What are we to think, for example, of *erythrinus*, *pellucidator*, *torquilla*, *lacteator*, *minutorius*, *pectoratorius*, *hyalinata*, *frondescentiæ*, *nuficapitella*, *hyppolais*, *subbimaculella*, *punctaurella*, etc., etc., all of erroneous construction? names selected at random, belonging to a class which contains thousands of equally offending species, and hundreds which offend ten times more grossly. Unhappily, the evil has taken such extensive root, that a man must possess no ordinary degree of perseverance who would sit down to revise and correct the whole list; but something, it is evident, should be done, and I think the existence of the evil alluded to in any species to be quite a sufficient reason for its alteration. It must be understood as professed, in forming our nomenclatures at all from the Greek and Latin languages, that some propriety should be observed in the formation, and when this is

not attended to, it has not been intentional on the part of the nominator, but has arisen from inability, or carelessness, or from a wish to adopt a similarity of termination. Connected with this subject is the desirableness of a similarity of termination* in the names of the species of a genus, agreeing also, if possible, with the termination of the generic name itself; but I must decline giving my opinion whether this be feasible or not in all cases. As one great means towards effecting a classical uniformity of nomenclature, it appears to me desirable that generic names should be of Greek, and specific names of Latin, origin; this distinction has been already obscurely and insufficiently acted upon, as will appear by reference to any general catalogue, but so inadequately and imperfectly as to form only exceptions to the rule. If the rule of grammatical propriety be not attended to in the first instance, any succeeding writer whose ear may be offended by the improper expression will feel called upon to alter the erroneous name; and this, in very many cases, would cause so great an alteration in the form of the word as to add to the already too numerous list of synonyms. As an example, the first which occurs to me, and, therefore, by no means so strong a one as might be adduced, I will take the generic name of the common Brown Owl, *Aluco auctorum*. Now this word does not occur in the Latin language, but doubtless *Alucus* was intended, which may be found in all dictionaries (whether from the habits of the bird it has anything to do with "*lucus a non lucendo*" is more than I can say): of this I was not aware when I first published my *Guide to an Arrangement of British Birds*, but as soon as I discovered the error I corrected it in the *Supplement*. The English names of our birds remain last to be considered, but for the present I must leave the subject: when I resume it, I will give a synoptical table of British ornithology, formed according to the rules laid down above, as the basis of a second edition of the *Guide*, which I am now preparing.

(To be continued).

ON THE CHELIFER.

It has been generally admitted that the *Chelifer*, a species of small articulated octopod animal, does not spin a filament like their congener, the Spider. Mr. Lucas has, however, established that the *Chelifers* do possess the faculty of secreting a given number of threads, but to a smaller extent than those of the Spider, and under different circumstances of locality; which, doubtless, led to the erroneous opinion hitherto entertained by Naturalists on this subject.

* Above all things, there should be no difference of gender in the several species genus.

REMINISCENCES OF THE RHINE;

ORNITHOLOGICAL AND ENTOMOLOGICAL.

THE following notices, made during a recent tour on the Rhine, may not be considered altogether unworthy a place in the pages of *The Naturalist*, conceiving, as I do, that the slightest contributions, detailing facts, may assist others who, with more knowledge, perseverance, and means, may be treading the same paths, and enable them to devote their attention to particular spots in search of those favourite objects which the Naturalist, of whatever class he may be, hails with a delight unknown and incomprehensible to the non-observer of those minuter portions of the living world, who pass them by unheeded and disregarded, as unworthy of a moment's contemplation. The time comprised within the limits of these observations was a period of about six weeks, commencing from the middle of June. When leaving England, I unfortunately omitted to re-provide myself with nippers and insect nets, which I had transferred to the hands of a friend embarking on a distant and arduous expedition—an omission I was unable satisfactorily to supply in any one of the large continental towns through which I passed, and which I the more regret as I was perpetually tantalized with glances at insects which, by the rapidity of their flight, eluded capture, and only left me to guess at their character and identity, without sufficient accuracy to enable me to record them with a certainty of being correct in my opinion. But for this unfortunate deficiency, I have no hesitation in saying, that, from the numbers I occasionally saw, and the rich field of discovery afforded by certain localities, I might have added to my stock an hundred fold, and not thought it necessary to apologize for the brief reminiscences I have now in my power to bestow.

I shall commence my list of birds with the Moor Buzzard, (*Falco æruginosus*). I can only speak positively to one specimen, seen through a telescope, as it rested immoveably, perched on the dead branch of a tree in rather a wild and open part of the country near Wiesbaden. I had watched its motions for some time as it slowly and sluggishly skimmed over the adjacent field and marsh grounds, and I have reason to suspect that some other birds of the Hawk tribe, which I had occasionally noticed soaring high in the air, were of this species, as the males, during the breeding season, which might be considered as scarcely passed, are said to elevate themselves to considerable heights, and remain suspended on the wing for a length of time.

The Kite, (*Falco milvus*). I can well remember the time, in my boyhood, when two, three, or even more of these large and graceful birds might be seen almost any day winging their wide circles, and rising or descending in spiral flights; but the race, in England, seems rapidly to approach extinction—whether from the increased vigilance of game-keepers, increase of population, or other

unknown causes, I leave for the determination of abler Naturalists. It was, therefore, with a sort of friendly feeling, associated with years long gone by, that I again hailed the appearance of these birds—abundant as once in my own land—soaring above me when in the valleys, or below me as I looked down on that splendid view which bursts upon the sight from the battlements of the Attenschloss, or old castle of Baden Baden. In the latter case, when their airy forms, lightened up by the rays of a continental sun of which England is doomed never to know the brilliancy, were relieved by contrast with the dark shades of the pine-forest beneath, every graceful motion might be observed, the almost invisible quivering of the wing, the varied rudder-like guidance of the lengthy forked tail—now lateral, now perpendicular—and the keen, penetrating eye, as the pirate of the woods floated slowly by on a level with the castle rock. From their numbers, it would appear that the *gardes de chasse* of the Grand Duke allowed them to exist unmolested.

The Eagle Owl, (*Strix bubo*). The only specimen I saw was an unfortunate captive, imprisoned in a wicker cage, in the most inappropriate situation imaginable for a solitary and hermit-like tenant of the forest and the wilderness. There he stood erect, with his bright, brilliant, glaring, golden eyes—now half-opening, now closing—then, shaded by the intervention of his nictitating membrane, exposed to the full light of the noon sun, with the additional reflection of the wide sheet of waters of the Rhine immediately before him. But this, perhaps, he counted the most insignificant of the daily evils he was doomed to suffer; for his prison was within a yard or so of a public garden, filling up a vacant angle between the entrance and the front door of one of the most crowded and noisy hotels in Cologne—inviting, by its juxta position to the public path, a visit from every passer by, man, woman, or child; the former suffocating, and offending his nice sense of smell, by clouds of smoke from countless and ever-puffing cigars—the second deafening his ears by an incessant Babel of unknown tongues—and the third, in addition to cries and ejaculations, poking and annoying him with sticks or any other assailing materials within their reach: the garden, moreover, overflowing from morning till night with visitors of all nations and descriptions, for whose amusement (most assuredly not for the Eagle Owl's) a loud military band was employed morning and evening, and, when required, at intermediate times, to exercise their vacation.

It was said to have been taken in the neighbourhood, but the exact locality I could not ascertain. Poor bird! How differently situated from the last I had noticed of his species on the Continent. At midnight, in one of the wildest gorges and dark forests of the Pyrenees, impinging on the dreary flanks of the Maladitta, I was roused from a reverie by a startling and unearthly shriek. It was the cry of the Eagle Owl, and I shall never forget it.

Butcher Bird, (*Lanius excubitor*). Never having seen this species alive and

at liberty in England, I was at first rather at a loss to ascertain the name of a bird which allowed me frequently to approach within a few yards, as it sat on the projecting twig of a bush in the vallies of the hilly district of Baden Baden. I can testify to the power assigned to it by some Naturalists, of varying its notes, or rather imitating those of other birds. Not exactly, indeed; for my first acquaintance with the Butcher bird was occasioned by hearing notes not entirely familiar to me, though much resembling those of the Stonechat. Following the sound, I soon discovered the utterer, and while listening, to my surprise, the original notes were discarded and others adopted of a softer and more melodious character, never, however, prolonged to any thing like a continuous song. Its grave ash coloured garb with its peculiar black patch on the cheek, soon convinced me that my unknown friend was the Butcher bird, that petty tyrant of its neighbourhood, carrying on incessant warfare and wanton waste of life amongst the small fry of the passerine order, and whose war-cry was wont to set a host of minor warblers to flight. When contemplating the plump, comfortable, tame-looking bird before me, its placid look and mild demeanour beaming, as far as externals might be depended on, with benevolence and good will to every songster of the grove, I could scarcely persuade myself that its character had not been grossly libelled, and that such a picture of *bonhomie* was not, in truth, the friend and guardian of his lesser feathered brethren. But that his tender mercies were cruel was a fact too firmly established to admit of doubt; and as he flitted away to a distant spray, I was left alone to meditate on the truth of the adage, applicable to birds as well as men, *nimum ne crede colori*.

The Golden Oriole, (*Oriolus Galbula*). I might for a moment have had my doubts as to the specific identity of the last mentioned bird, but here there can be neither error nor hesitation. On the least observing, this concentrated essence of golden plumage obtrudes itself; and who that has ever once seen this passing meteor of brightness, even on the wing, can doubt of its being the Golden Oriole. I saw but one in a state of freedom; its presence adding one more item towards perfection in the lovely entrance of the valley leading to the mineral springs of Tonestein, and the solitary lake and convent in the circuitous route between Brühl and Andernach. I could not find that they were common anywhere; if, indeed, plentifully distributed over the country, they ought to be much oftener seen, as they are in the habit of frequenting orchards or gardens; being, like our Jays, sad thieves when the ripened cherry-trees tempt them to become purloiners. I suspect, however, that they are locally gregarious; for a French Naturalist once assured me that, in his roamings through the forests of his district, months often passed without his falling in with a single bird; whereas, at other times, not limited to particular seasons, he occasionally found them in comparative abundance. In the public market at Cologne I saw a pair of young ones in nearly full plumage, for which I was asked the moderate sum of three shillings. Had my steps been bending downwards on the Rhine, instead of upwards with a long journey before

me, assuredly these two birds should at this moment have formed a part and parcel of my domestic establishment, and you, Mr. Editor, might have haply been gratified with a more minute detail of the habits of this beautiful portion of the feathered creation.

Storks, (*Ciconia*). Who that has traversed Holland, Belgium, &c., has has not exclaimed, as they first caught sight of these birds, "Look at the Storks!" as one or two, statue-like, motionless as marble, balanced on a single slender leg, presented themselves to view, perched on the summit of a picturesque chimney top, like a grotesque colume whose capital was an overhanging bush of thorns and twigs. There they stand, with the addition, if later in the season, of some two, three, or four queer-looking, puffy, amorphous-looking things by them, which, but for projecting beaks ever and anon gaping and shutting with a sort of clacking sound, might be taken for an accumulation of cotton fluffs. Should only one of these immoveable sentinels be on its post, the spectator will do well to continue on the watch; for in a very few minutes his attention will be drawn to the arrival of a partner in the nursery proceedings of the chimney top, slowly and gracefully gliding through the air, and taking position within neck's reach of the puff-bodied offspring. Pausing for a moment, the fresh comer's neck is stretched forth, and the head bent at a right angle, so as to place the beak in a perpendicular position between the mandibles of one of the expectant candidates for the produce of the parental craw. Another moment's pause, and then the perpendicular beak, opening with a sort of spasmodic jerk, disgorges the result of its forage in their fens and marshes, with unerring aim, down the throat of the recipient young one, which, with quivering extacy, gulps down the semi-digested mass of frogs, minnows, or other gelatinous materials provided for the repast; which being finished, all the parties concerned resume, for a time, their motionless and noiseless attitude. They look the pictures of meditation; and who shall say that those grave heads are not dwelling on subjects surpassing man's understanding? There is one who has given them a power of thought and discrimination unpossessed and unintelligible to us, by which, with a truth which sets the skill of the most experienced navigator at defiance, the Stork learneth its appointed time, and when and how to wend its way to other regions destined to be its residence for the remainder of the year. Were these feathered philosophers allowed utterance but for an hour, how much might they disclose of the instinctive machinery whereby the Creator provides for the well-being of all his living works! and with what admiration should we be made partakers of this additional development of the expansive agency of Omnipotence!

I shall conclude my few ornithological remarks by alluding to the small number of birds, generally speaking, usually met with on the continent. These observations have been forced upon me repeatedly in the many excursions I have, at various times, made in all directions. Magpies, Jays, and even Crows, are, in

many districts, almost rarities, for miles and miles may be often passed without seeing one. The lesser birds are, also, in like manner, comparatively scarce; Sparrows, which, whether in London streets or our rural lanes, meet us at every step, are by no means plentiful on the other side the water; but in many parts, and I may instance Baden and environs in particular, Chaffinches appear not only to occupy their place, but assume their bold character. For one Sparrow I have counted twenty or more Chaffinches; and those who, like myself, may have preferred breakfasting under the shady trees in the beautiful grounds adjacent to the castle at Heidelberg to the common room of the hotels in the town below, will bear me out in testifying to the boldness of the *Motacilla caelebs*. I have seen them repeatedly not only contend with each other for the crumbs within a yard of my feet, but even perch on the table and carry off the pieces of bread I placed within their reach.

Before finally dismissing the subject of birds, I cannot help referring to the admirable collection in the museums at Leyden and Bonn—but more especially the former—both excellent in all respects. I must, however, confine myself to the case in point, and refer to the unrivalled collection of ornithological skeletons, set up and prepared in the most perfect manner; and I am induced to allude to it more particularly, with a hope that this highly important branch of Natural History may be more attended to in our own museums. The comparative anatomy of birds is in itself a subject of the highest interest on every account, and is entitled, I should venture, with all deference, to assert, to at least as much, if not more, attention than the outward form and garb; and yet in our own country there is scarcely a museum where the slightest is paid. Probably the difficulty of preparing skeletons may have acted as an obstacle. I am perfectly aware of the nicety required and the disappointments that too frequently ensue; and perhaps, Mr. Editor, I cannot do better than to entreat you to call upon your friends and readers, who are competent to the task, to afford, through the medium of the pages of *The Naturalist*, the best modes of making these preparations. What an invaluable addition would it be to our practical knowledge, if chemistry could point out any corrosive substance which would rapidly decompose the flesh without destroying the ligatures by which the bones are held together!

[To be continued.]

OBSERVATIONS ON THE BRITISH SPECIES OF MYOSOTIS.

By ROBERT J. N. STREETEN, M. D.

IN the *Species Plantarum* of Linneus four species of the genus *Myosotis* are enumerated. Two of these are now referred to *Echinospermum*; of the remaining two, the *Myosotis scorpioides* is the only one with which we are, at present, concerned. Under this name the immortal founder of systematic botany—for until his time the science was little more than a *rudis indigestaque moles*, a confused mass of observations beyond the powers of the most retentive memory to retain—appears to have included several of the now recognized species, three of which he indeed characterizes as varieties. Of these varieties the first, α , is the *Myosotis arvensis* of the Swedish botanists and of Hooker's *British Flora*; the second, β , is the *M. palustris* of modern authors, the true Forget-me-not; and the third, γ , is the *M. versicolor* of Lehman and others. Our countryman, Ray, had already recognized these varieties, and Dillenius had added another, the *Myosotis scorpioides latifolia hirsuta* (*M. sylvatica* of Hooker's *British Flora*), of which he gives a figure. This last, however, appears to have been first admitted as a distinct species of the flora of this country by Sir James Smith, in his *English Flora*, under the name of *M. intermedia*, although he erroneously refers the plant of Dillenius to his *M. sylvatica*, which is the *M. arvensis* of the *British Flora*; Hudson had previously admitted it as a variety of *M. scorpioides* in his *Flora Anglica*, in addition to those described in the *Species Plantarum*. Sir James Smith and Sir William J. Hooker have not only recognized the preceding as species but have admitted three new ones—the *M. alpestris* of Schmidt, the *M. cæspitosa* of Schultz (?) and the *M. collina* of Hoffman; which last is the *M. arvensis* of the *English Flora*, although with some erroneous synonyms. To these may, perhaps, be added the *M. repens* of Don, which is admitted as a distinct species by some foreign botanists, although it has hitherto been considered, by British authors, as a variety merely of *M. palustris*.

Having made these preliminary observations, I proceed now to give the characters of the genus and species, with such remarks as may be required for their further elucidation.

MYOSOTIS, Linn.—SCORPION GRASS.

Linnean Class, *Pentandria*—Order, *Monogynia*.

Natural Order, *Boraginæ*, Jussieu.

Gen. Char.—*Calyx* five-cleft or five-toothed. *Corolla* salver-shaped, with a short tube; the lobes obtuse, emarginate; the mouth half-closed, with short rounded scales. *Nuts* smooth, perforated at the base.

1. *M. palustris*, "Kiphoff," (*Great Water Scorpion Grass. Forget-me-not*). Calyx with straight appressed bristles; when in fruit campanulate, with short, broad, spreading teeth, shorter than the divergent pedicels. Limb of the corolla flat, longer than the tube. Pubescence of the stem spreading. Racemes leafless.

M. palustris, *Eng. Bot.*, t. 1973; With., ed. 3, v. ii., p. 225; Smith, *Engl. Fl.*, v. i., p. 249; Borr. in Hook. *Br. Fl.*, ed. 3, p. 101. *M. scorpioides*, β , Linn., *Sp. Plant.*, p. 188. *M. scorpioides*, δ , Huds., p. 78. *M. scorpioides palustris*, Rati *Syn.*, p. 229.

Ditches and sides of rivers; common. Perennial; flowers from June to September. *Roots* long and creeping. *Herb* bright green. *Stems* from twelve to eighteen inches high, ascending, branched, leafy, clothed with short, spreading, bristly hairs. *Leaves* sessile, elliptic-oblong, rough, with appressed bristles. *Flowers* in long leafless clusters, very beautiful, of a bright blue colour and enamelled appearance. This is the true Forget-me-not; the *Vergiss me nicht* of the Germans. The elegance and enamelled brilliancy of its soft blue flowers has rendered this little plant a general favourite, and drawn to it the attention of the poet and the moralist. The legend to which it owes its popular name is not generally known, and may, therefore, not be unacceptable here. A young German maiden, walking with her lover by the side of a brook or stream, whose sparkling waters were rolling rapidly along its course, observed the flowers on the opposite bank. Attracted by their beauty, she expressed a wish for them; when the young man instantly plunged into the stream, the deceitful clearness of whose waters disguised the depth. He with difficulty reached the opposite bank so as to obtain the flowers, but was immediately carried away by the force of the current. Hastily throwing them to his beloved, and exclaiming "*Vergiss me nicht! Vergiss me nicht!*"—Forget-me-not! Forget-me-not!—he sunk to rise no more. The memory of the unfortunate youth, and the faithfulness of the disconsolate girl, have ever since been preserved in the name of the flowers, and the Forget-me-not has, from this period, been considered as the emblem of constancy and truth—of friendship and love. The following lines, expressive of this emblematical signification, are a nearly literal translation of a stanza in a very beautiful poem called *Die Sprache der Blumen*, or the language of flowers:

"Anxious and care-worn is thy lot?
Behold yon floweret in the murmuring stream,
Friendly, and light, and blue, its star-like gleam:
Love names it the Forget-me-not.
Would'st thou thy life not waste in sorrow vain,
With holy hands the truth thou wilt retain."†

† From the German of Schreiber.

2. *M. repens*, Don, MSS., (*Creeping Scorpion Grass*). *M. palustris*, β , Hook., *Scot.*, p. 67.

I am unable to give the character of this plant, as I have had no opportunity of seeing specimens, or of consulting a description; the short, broad teeth of the calyx are, however, so constant in *M. palustris*, and the value of the characters derived from the calyx in this genus so generally admitted, that we can scarcely refuse to adopt the suggestions which have been thrown out respecting this plant, without, at the same time, invalidating almost the only distinctive marks which we have for discriminating the species of *Myosotis* in general. Mr. Borrer observes—“Perhaps *M. repens*, Don, may be specifically distinguished by the deeply-divided calyx (which I pointed out long ago to Sir J. E. Smith) and the copious pubescence of that part. Its racemes are not always, although very often, leafy.”—Hook. *Br. Fl.*, ed. 3, p. 101. And in a note it is stated—“Mr. Backhouse observes to me that the bracteas among the pedicels are constant; the laciniae of the calyx narrower and shorter (?) than in *M. palustris*, full half as long as the calyx, and the whole plant smaller: the calyx is nerved. It flowers earlier by two months in the higher parts of Yorkshire than *M. palustris* does in the lower.” It is found in moist situations in Scotland (*Messrs. G. and D. Don*) and in the higher parts of Yorkshire (*Mr. Backhouse*).

3. *M. lingulata*, Lehman? (*Lesser Water Scorpion Grass*). Calyx with straight appressed bristles; when in fruit campanulate, with broad spreading teeth, shorter than the divergent pedicels. Limb of the corolla concave, equalling the tube. Pubescence of the stem appressed. Racemes leafy.

M. lingulata, Lehm., *Asperif.*, p. 110? *M. cæspitosa*, Schultz? Smith, *Engl. Fl.*, v. i., p. 450; *Engl. Bot.*, t. 2661; Borr. in Hook. *Br. Fl.*, ed. 3, p. 102.

Ditches and watery places; common. Annual or biennial; flowers from May to August. Root fibrous. Herb lax, pale green. Stems about a foot high, throwing out fibres from the lower joints, ascending, slender, leafy. Leaves shorter and somewhat broader than those of *M. palustris*. Flowers smaller. Calyx more deeply divided. The specific name *cæspitosa* is so singularly inappropriate that I cannot but suppose there must be some error in quoting Schultz for this plant under that name, although I have not the means of satisfying myself upon this point. At all events, Lehman's name of *M. lingulata*, if, indeed, it applies to the same species, is not only more applicable, but has the claim of priority in respect of publication. I have foreign specimens of a plant which may possibly be the *M. cæspitosa* of Schultz; of which the following are the characters. Calyx with straight appressed bristles. When in fruit campanulate with lanceolate teeth, equalling the recurved pedicels. Limb of the corolla flat, longer than the tube. Pubescence of the stem appressed. Racemes leafless. The habit is that of *M. palustris* but the whole plant is much smaller, my specimens being

from two to four inches high. *Root* of several long fibres. *Stems* erect, apparently tufted. The *flowers* are equal in size and beauty to those of *M. palustris*, but the pedicels are recurved and rather shorter than the calyx which is nearly half five-cleft and its segments narrower and deeper than those of *M. palustris*.

4. *M. alpestris*, Schmidt, (*Rock Scorpion Grass*.) Calyx with straight bristles, the lowermost incurved, deeply five-cleft, when in fruit campanulate, straight, shorter than the slightly spreading pedicels. Limb of the corolla flat, longer than the tube. Root-leaves on long stalks. Racemes leafless.

M. alpestris, Hook. *Scot.*, p. 66.; Smith, *Engl. Fl.*, v. 1., p. 252.; Borr. in Hook., *Br. Fl.*, p. 102. *M. rupicola*, *Engl. Bot.*, t. 2559.

Highlands of Scotland, on the Breadalbane range. Perennial; flowers in July and August. *Root* fibrous. *Stems* from four to six inches high, leafy, clothed with spreading hairs. *Flowers* large, of a brilliant blue, as beautiful as those of *M. palustris*.

5. *M. sylvatica*, Hoffm., (*Wood Scorpion Grass*). Calyx with spreading hooked bristles, deeply five-cleft, when in fruit ovate with closely converging teeth, shorter than the divergent pedicels. Limb of the corolla flat, longer than the tube. Root-leaves on short dilated stalks. Racemes leafless.

M. sylvatica, Hook. *Scot.*, p. 66. Borr. in Hook. *Br. Fl.*, ed. 3, p. 103. *M. intermedia*, Smith, *Engl. Fl.*, v. 1, p. 250, (excl. syn.) *M. scorpioides*, γ, Huds., p. 78. *M. scorpioides latifolia hirsuta*, Dill. in Raii *Syn.*, p. 229. t. 9., f. 2.

Dry shady places; Essex and Kent, *Dillenius*; Norfolk, *Rev. R. B. Francis*; woods; North of England; and Lowlands of Scotland, *Sir W. J. Hooker*. Perennial; flowers in June and July. *Herb* of a dull green and covered with lax hairs. *Leaves* oblong, broader than those of *M. arvensis*. *Flowers* nearly as large as those of *M. palustris*. Mr. Borrer observes, various authors and cultivators pronounce this plant perennial, (Fries says "perennans," Wahlenberg "subperennans,") whilst the following species (*M. arvensis*, Hoffm.) is indubitably annual, between which and the present individual I can point out no other distinctive characters more satisfactory than the somewhat more deeply divided calyx of *M. sylvatica*, its shorter and less remarkably hooked bristles, the broader and flatter corolla, and the greater size of the whole plant." (Hooker's *British Flora*, ed. 3., p. 103.) Sir J. Smith, in the *English Flora*, has strangely confounded the synonyms of these two plants and certainly misapplied that of *Dillenius* to his *M. sylvatica*, which is *M. arvensis* of the *British Flora*, but there is no ambiguity either in the description of his *M. intermedia* or in the character which he assigns to it. They have obviously been drawn up from this plant, *M. sylvatica*, and there can be no hesitation, therefore, in referring *M. intermedia* of the *English Flora* here. I am inclined to think that this species is by no means common.

6. *M. arvensis*, Hoffm., (*Field Scorpion Grass*). Calyx with spreading hooked bristles, half five-cleft, when in fruit ovate with closely converging teeth, shorter than the divergent pedicels. Limb of the corolla concave, equalling the tube. Racemes with a leaf at the base.

M. arvensis, Hook. *Scot.*, p. 67, (excl. syn.); *Engl. Bot.*, t. 2629; Borr. in Hook. *Brit. Fl.*, ed. 3, p. 103. *M. sylvatica*, Smith, *Engl. Fl.*, v. i., p. 251, (excl. syn.)? *M. scorpioides*, *as*, Linn., *Sp. Plant.*, p. 188; Huds. p. 78. *M. scorpioides hirsuta*, Raii *Syn.*, p. 229.

In fields, gardens, cultivated places, hedge-banks, &c. Very common. Annual; flowers from May to September. Root fibrous. Herb of a rather pale green, clothed with lax, spreading, soft hairs. Stems from 12 or 18 inches to 2 feet high, branched above, leafy. Leaves oblong, the lower ones and root-leaves on dilated stalks. Racemes terminal, usually with a leaf at the base, and axillary, the terminal raceme forked, frequently with one flower situated exactly in the axil of the fork. Flowers smaller than in any of the preceding. This is, according to Fries, the “ipsissimam *M. arvensem*, Linn.,” and, as Mr. Borrer observes, “the only one usually found in cultivated fields.” Sir J. Smith’s *M. arvensis* is probably the *M. collina*, Hoffm.; although he appears to have had very indistinct ideas respecting this species, as well as the present. Indeed it is difficult to decide what his *M. sylvatica* may have been, and the description would seem to have been drawn up partly from this and partly from the preceding. Withering’s *M. arvensis* refers especially to the present species, but includes, also, the preceding and *M. versicolor*, and probably, also, the *M. collina* of the *British Flora*. The *M. arvensis* is certainly the most common of our British species, and abounds along the borders of cornfields, under hedge-rows, &c., attracting attention by its long clusters of pretty blue star-like flowers, which, although neither so conspicuous nor so elegant as those of the true Forget-me-not, are yet sufficiently so to deserve the notice of the admirer of Flora’s treasures. A fairy bouquet of jewels of no ordinary beauty may be formed from these sapphire-like flowerets, in conjunction with the small pink or amethystine rosettes of *Geranium molle* or *Arenaria rubra*, the pure-white pearly stars of many rays of *Stellaria graminea*, and the little golden Maltese crosses of *Galium cruciatum*.

7. *M. collina*, Hoffm., (*Early Scorpion Grass*). Calyx with spreading hooked bristles, when in fruit ventricose open, equalling the recurved pedicels. Limb of the corolla concave, shorter than the tube. Raceme usually with one remote flower near the base.

M. collina, Borr. in Hook. *Br. Fl.*, ed. 3, p. 103. *M. arvensis*, *Engl. Bot.*, t. 2558; Smith, *Eng. Fl.*, v. i., p. 252, (excl. syn.).

Sandy banks, walls, and dry places. Not common. Near Edinburgh, *Dr. Greville*; near Hagley, Worcestershire. Annual; flowers April and May. Stems from two to six inches high, clothed, as well as the leaves, with open silky

pubescence. *Flowers* blue, very small, in simple racemes; the lowermost flower usually remote, near the base of the raceme; sometimes, though rarely, in the axil of the leaf from which it springs. Its flower-stalks are remarkably recurved when in fruit, in my specimens. It is probable that this species, in consequence of its early flowering and fugacious nature, may frequently escape notice; but I am convinced that it is not a common plant, as the above station on a sand-bank near Hagley, is the only one in which I have hitherto detected it. The smaller varieties of *M. arvensis* are probably sometimes confounded with this species; and judging from the list of synonymes in the *English Flora* attached to the *M. arvensis* of its lamented author, which is really this plant, Sir James Smith does not appear to have been exempt from this error.

8. *M. versicolor*, Lehm., (*Yellow and Blue Scorpion Grass*). Calyx with spreading hooked bristles, when in fruit oblong, longer than the almost erect pedicels. Limb of the corolla concave, shorter than the exerted tube.

M. versicolor, *Eng. Bot.*, t. 2558; Hook. *Scot.*, p. 67; Smith, *Eng. Fl.*, v. i., p. 253; Borr. in Hook. *Br. Fl.*, ed. 3, p. 104. *M. scorpioides*, β , Huds., p. 78. *M. scorpioides*, γ , Linn., *Sp. Plant.*, p. 189. *M. scorpioides hirta minor*, Raii *Syn.*, p. 229.

Dry sandy fields and pastures, on walls, in wet meadows, &c. Common. Annual; flowers from April to June. *Root* fibrous. *Stem* four to six inches high, branching from the base, clothed with lax whitish hairs, leafy. *Flowers* upon long-stalked racemes, changing colour from yellow to blue as the spirally-curved summit of the stalk is unfolded. The *calyx* is very deeply cleft, more than three-fourths of its length, and by no means closed when in fruit, as stated in the *British Flora*. The succession of blue and yellow flowers is a very curious fact, and one which deserves more investigation than it has yet received; as the change of colour from yellow to blue is not easily accounted for. There can, however, be little doubt that it really occurs, as an attentive examination of the flowers shews that the upper or younger ones, as Mr. Borrer has remarked, are always yellow, while the lower or older ones are as constantly blue. This plant attains a considerable elevation: I have found it growing luxuriantly on the North Hill, Malvern, near the summit, (which is about 1400 feet above the level of the sea), and also on the top of Ankerdyne Hill. But, notwithstanding the high authority of the authors of the *English* and *British Floras*, I am disposed to think that it is not generally of very common occurrence. It is certainly not frequent in the neighbourhood of Worcester; and the late Mr. Purton, in his excellent *Midland Flora*, marks it as rare, giving only the habitat on the Malvern Hills, where I have myself found it.

The various colours of the flowers and other parts of plants have been supposed to be owing to variations in the degree of oxydation. Light obviously exerts great influence in developing colours: thus the leaves of plants

may be blanched by excluding them from this agent. Lettuces, endive, celery, kale, and other vegetables, are prepared for the table by preventing the access of light, as in the operations of tying up the leaves, earthing the roots, or covering the whole plant with opaque earthen pots. The bleached pallid appearance of greenhouse plants which have been kept in situations where the light has not been sufficiently admitted, arises, also, from the same cause; while the brilliancy and intensity of the colours of flowers in tropical and alpine countries is owing to the intensity of the light and the clearness of the atmosphere in such situations. Exposure to light, therefore, tends to develop the colours of plants; but in what way the effect is produced is not so evident. Whether it arises from any chemical change in the state of oxydation, or from any physical variation in the optical properties of the vegetable tissues from their more vigorous growth and nutrition when under the stimulus of this powerful and pervading influence, does not seem clear. The green parts of plants, especially the leaves, exhale oxygen, as is well known, on exposure to the light of the sun; while the coloured parts, such as the flowers, more frequently exhale hydrogen and azote. By the action of alkalies, also, the red colour of many flowers becomes, in succession, blue, green, and ultimately even yellow—a change which may possibly be owing to their acting as deoxydizing principles. The change in the blossoms of the *Myosotis versicolor* is from yellow to blue, and ultimately to faded purple or red—that is under exposure to the light, which, as it induces the exhalation of hydrogen and azote from the coloured parts, tends, therefore to the accumulation of oxygen in the same parts, the yellow passes successively into blue and a faded purple or pink. I have, however, never observed any approach to the intermediate stage of green between the yellow and the blue flowerets of *M. versicolor*. The investigation of the causes to which the colours of flowers are owing is very important, both in relation to vegetable physiology and to optics; and this little plant seems well calculated, when submitted to judicious experiments, to afford valuable information to the inquirer into these interesting arcana of natural and physical science.

BOA CONSTRICTORS.—A recent traveller in South America, journeying from Lima to Vara, in the Brazils, observed that the inhabitants of the latter place take great pleasure in rearing the *Boa Constrictor* (*quere* Python Tigris); and that Mr. Smith, the North American consul, possesses several for the purpose of destroying Rats, with which those parts are terribly infested. These creatures sometimes attain the length of eighteen feet, and the colours of their skin are brilliant beyond description, particularly after moulting. They have never been known to injure any one, and even exhibit local attachment to places and persons.

PHOSPHORESCENT APPEARANCE OF THE SEA.

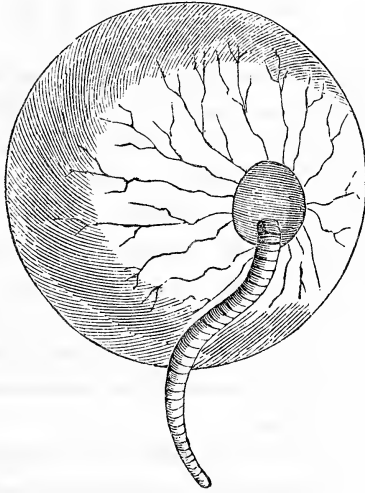
By C. DUBOIS, F. L. S.

AT certain seasons of the year particularly, the sea presents, at night, a luminous appearance—small sparks being, as it were, constantly emitted in quick succession, similar to an electrical series. Naturalists have long been undetermined as to the precise cause of this pleasing phenomenon; but their explanations are sometimes contradictory, and often doubtful. By some it was ascribed to electricity or magnetism; by others to the putrescent state of vegetable or animal matter floating on the surface of the water; others, much nearer the truth, attributed the phosphorescent appearance of the sea to myriads of luminous animalculæ; and there is nothing to prevent the conclusion that these different opinions have, when united, explained the principal features of the phenomenon; but the error lies in exclusively ascribing it to either.

The luminosity of the sea is evidently due, in many instances, to the presence of excessively numerous animalculæ, possessing the property of throwing out small bright sparks while they are alive and in a state of activity: it may, also, occur that the vegetable and animal rejectimenta exhibit a phosphorescent light; other simple mucous substances, incapable of definition, may do the like; and various mysterious chemical combinations may also contribute to the same effect: but, generally speaking, the luminous brilliancy of the sea is most frequently occasioned by marine animalia. Animal phosphorescence is either general or particular: in the latter case, it is produced by animals of a greater or smaller structure, and not numerous in a circumscribed space: these are polypi, radiata, medusæ, pyrsomæ, biphoræ, and some species of fishes, &c. The general phosphorescence of the sea—which always extends over a far greater limit—must, therefore, be attributed to myriads of microscopic animals. Péron, Eschscholtz, Quoy, Gaimard, Merrens, Surriray, Lesson, and many other distinguished Naturalists, have described these animals, and observed that they lose their luminous property after death, or in consequence of a loss of activity. In hot and tempestuous weather, these animals are most abundantly seen, and their phosphorescence more considerable. It is easy to convince ourselves that to their existence the luminous appearance of the sea, in certain situations, can alone be attributed; since a quantity of water exhibits light in a receptacle, so long as it contains living animals of that species, and it ceases to be so if they are deprived of life by the insertion of a tin wire into the water.

In the ocean, and on the French coasts, the animal producing this phenomenon is named, by M. Surriray, *Noctiluca miliaris*; and we here give its portrait, immensely magnified, since its natural size does not exceed 1-1000th of an inch.

It belongs to a group of the *actinozoaria*, or radiated animals ; and De Blainville places it in the *Diphydæ*.

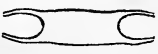


The *Noctiluca miliaris*, here figured, is of a globular form, to which is attached a peduncle or tail-like appendage ; and its interior exhibits, through the pellicle, numerous radiating vessels emanating from an ellipitical centre, placed nearer to one side of the circle than the other. During life, these appear to dilate and expand ; and the phosphorescent property lies in them, but is only exhibited during a state of activity, when their motion is too rapid to be observed, resembling a quick pulsation. The whole globular mass being propelled in every direction by a jerking motion of the pedunculated stem, the extreme difficulty of catching sight of one of these little restless creatures in a humour to be minutely examined, prevents a more detailed description ; but we beg leave to call the attention of Naturalists so situated as to have frequent opportunities of investigating their structure, in order to elucidate more clearly the singular natural phenomenon produced by this wonderful Marine Illumination Company.

A CORRESPONDENT is desirous of ascertaining the best existing catalogues in the various departments of Natural History. He wishes to know from what works, whether professedly catalogues or not, the most comprehensive lists may be obtained of the different classes of animated nature, by adding which together, the amount of the grand total might be roughly guessed at—as far, at least, as our present confessedly scanty knowledge of the hosts by which we are surrounded would allow us.

OVA OF THE SKATE-FISH.

HAVING discovered that a peculiar-looking substance, apparently the seed of some kind of sea-weed, was, in fact, the egg of the Skate-fish, I was induced to examine the same more minutely: in doing which I made the following observations:—

This egg is of a pale sea-green colour, becoming darker with age; in form it is a quadrangle, having at each corner long tuberos projections running parallel to each other from the narrow side of the shell, thus:  These horn-like tubes are open at their ends, through which the sea-water is admitted. The shell is tough, elastic, and extremely difficult to open—indeed not easily with the assistance of a knife—and very liable to shrink when laid to dry, unless it is first filled with sand. They differ much in size, depending, I am inclined to believe, on the size of the fish. On some shells I have observed sea-weed growing—an interesting fact, as it shows either the rapidity with which sea-weed will spring up, or the length of time before the fish is perfect; perhaps both, for one fish, which appeared on the verge of breaking the shell, I kept for examination, and it was one month before it assumed a perfect state.

As it would be tedious to mention the state of perfection the fish was found in, I will confine myself to the following observations:—

On opening the shell, a substance, having motion, is found, but so little formed as scarcely to be ascertained what it is. It is an embryo fish, attached by a tough sinuous substance* (rather difficult to cut in two) to the upper surface of something of the size and shape of a Sparrow's egg. Though in its earliest stage a person may conjecture what it is, yet, from its shapeless appearance, no one can speak with any certainty. It has a pale, watery appearance, and moves its tail with difficulty, as though it was a piece of sinew—a motion it possesses before it is spawned.† The pale colour becomes red, until it has the appearance of raw flesh, owing to the skin being transparent; it afterwards has the outward resemblance of a full-grown Skate.

The egg is covered with innumerable blood-vessels branching from one main trunk, which takes its rise from underneath the sinew by which the fish is attached to it, and running in parallel directions down the sides, are ultimately united to another large blood-vessel which runs into the same place from which the former main trunk sprung. From this I am inclined to suppose that the former is an artery conveying the nutritious blood through the egg; having performed that

* This substance I had to cut with a penknife.

† This statement appears correct; for one of these fish (in its earliest stage), having died, was cut from the egg to examine the latter, and then put aside: it soon dried up and became perfectly flat.

function, it is afterwards carried back by the latter to the place from which it sprung, where, after undergoing some process, it becomes nutritious, and again passes through the artery for the supply of the egg, &c. As the fish increases in size the egg decreases, the blood-vessels at length disappear, and the egg is ultimately reduced to the size of a pea, when it seems drawn up in the middle, and at length disappears, it being absorbed by that stomach which had been gradually forming from its humour. This stomach bears such a close resemblance to the colour of the egg, that, when half-formed, there at first sight appears to be two eggs.

On this egg being pricked, a liquid flows out having the appearance of humour; on examining the outward covering after pressing out the liquor, the blood vessels appear to be inclosed in it. If the liquor is suffered to dry it will form a soft gluey substance, similar to that of the yolk of a Fowl's egg.

It appears that the liquor from this egg supports and nourishes the fish in its embryo state, and afterwards performs one of the principal functions of its existence; probably the same function as the yolk of a Fowl's egg, *i. e.*, to assist the chicken forming in its shell, and ultimately form the entrails.

One fish taken from the shell in an early stage of its existence lived but a few hours. Another, probably advanced three or four days, and a third, apparently about to break its shell in about as many days, lived and came to perfection a month or five weeks after, the eye, though closed, being capable of motion all the time.*

It would, therefore, seem that life, or rather motion, commences at an early period of its embryo state; and probably about the time, or a little before, the egg is absorbed, the fish is perfect in all its parts, and capable of seeking its own nourishment; and when the egg is entirely absorbed hunger compels it to force its way out of the shell in search of food.†

A.

* The eye, when formed, appears inclined to open, but is prevented by long, narrow slips of skin-like eye-lashes, but united at their ends.

† From the number of sea-shells left by the tides about this time, it appears the ova come to perfection about the time shell-fish cast their shells; so that during this early stage of their existence providence directs they shall meet with food to support them in their state of weakness.

THE TURNIP FLY (*ATHALIA SPINARUM*).

SOME of your readers may not possibly be subscribers to Mr. Curtis's invaluable *British Entomology*; in which case they will not have seen the useful information his last number contains relative to the Turnip Fly, that pest of farmers. Respecting this insect there is so little known, even among those who are in other respects well-informed, that I strongly recommend an attentive perusal of Mr. Curtis's interesting description. It is not the fly itself that is the author of the damage, at least not in his winged state; he is, "*ut dicam*," comparatively innocent: but it is his former self—if I may be excused the Hibernicism—to which he is now "unlike, Oh, how unlike!" that causes all the mischief. Having emerged from his "durance vile" he displays a fine yellow body; but when he was a grovelling worm of the earth he was clad in sable robes—in mourning, if you will forgive the flight, for the destruction and havoc he was spreading all around him. Then he was confined to the turnip fields; and if the farmers had only possessed the information which Mr. Curtis has now given, they might have learned a simple and most easy method of getting rid of their countless enemies. If a hurdle is drawn lightly over the field it will brush them off the leaves, and once on the ground they are in their graves; they cannot make their way over the soil, or ever again ascend the stalk. But now that they are invested with wings they roam wherever their fancy leads them, having first probably deposited their eggs on the turnips, which is the only food on which their larvæ can live, as they will not even touch the swedes. Whether the perfect insect affects any particular plant does not appear to be satisfactorily ascertained; possibly not. Having been so long confined, in the larvæ state, to one kind of food (from its incapacity to search for any other), it now probably seeks for a greater variety of delicacies than formerly fell to his lot to enjoy. The winged insect appears as early as March, and is visible to the middle of October; the larvæ continue to the same time from about the middle of August. Ducks are particularly fond of the caterpillar, which is most plentiful the beginning of September, and if turned into the fields will eat them with avidity. The larvæ abound much more in some localities than others, but are said to have been more abundant this summer than they have been for the last thirty years. In very many fields the leaves of the turnips have withered and turned yellow; in some instances causing the entire destruction of the root, in others producing an unhealthy appearance. This occurred previous to the plants having attained their full growth, and they did not afterwards make much advance in size; the blight was upon them, and they looked as if they had been scorched by the hot wind of the desert. Some farmers attributed this destruction to the black caterpillar of which I have been speaking, though I think they are mistaken, as they only eat the fresh leaves, and would find no sustenance in the withered ones; but the secret, in my opinion, is, that the season which is favourable to the

appearance of the insect, and draws it forth from its long captivity, is uncongenial to the growth of the plant, which consequently fades or dies. Other agriculturists attribute the destruction to the *larvæ* of a plague of flies with which several parts of this county have lately been visited; but this I consider an erroneous supposition.

FRANCIS ORPEN MORRIS.

ON THE NESTS OF BIRDS.

IN the last number of *The Naturalist* an intelligent correspondent at Campsall Hall, gives an account of a most curious instance of eccentric nest-building, viz., "a Wren's nest in that of the Chimney Swallow," and invites the readers of *The Naturalist* to bring forward any parallel instances. I regret that he omitted to state in what situation the nest of the Swallow was built, as these delightful summer visitors will sometimes indulge a freak and choose a place of all others, to our ideas, the most unlikely. The handles of a pair of garden shears, the Owl and Conch Shell in White's *Selborne*, are convincing proofs. I now comply with Mr. C. T. Wood's wishes, by stating the following facts. In the spring of 1832, I was agreeably surprised to see a pair of Chimney Swallows busied in making their nest within a small shed in my garden, closed on three sides, but open to the east, at eight feet from the ground. In this nest they had two broods. In 1833 the nest was usurped by a pair of Wrens, and the Swallows, on their arrival, finding it so, made another nest on the opposite side, in which four eggs were deposited; I had then the satisfaction of shewing to my friends the nests of my pets, at twenty inches distance only from each other. A violent gale of wind in the night, during the Swallow's incubation, damaged the thatched roof of the shed, and in the morning I saw the nest hanging by a portion of the thatch, with the eggs remaining in it. I had it replaced immediately as well as I could, but it would not do; and from that time I lost the pleasing company of my Swallows. The other nest remains, and the Wrens have this year hatched their young in it, being the fourth of their occupation. I have hitherto taken out their old nest in autumn, to prevent the accumulation of insects, but have not done it at present, as I think of removing the shed. I shall be much gratified if my feathered favourites continue their domicile on my premises.

J. CLAYTON.

*Fishbourne, near Chichester,
Oct. 13th, 1836.*

ORNITHOLOGICAL NOTES.

HAVING been much interested by a singular instance of parental affection and sagacity of a Chaffinch (*Fringilla spiza*), I have thought that the anecdote might not be unacceptable to the readers of *The Naturalist*, for whom I accordingly transcribe it :—"This day week, I think it was, (says Mr. Maceroni, in a letter dated June 16,) it blew almost a gale of wind. A Chaffinch's nest, placed near the top of a high Common Escule, (*Esculus vulgaris*,)* in the front of the house, was damaged, and one of the young, nearly able to fly, fell to the ground, which I caught. It was old enough to eat of its own accord; and I kept it perched on a hen coop until this morning, when it contrived to get into the roof of a barn, and whilst I was attempting to get it down, surrounded at the time by four or five children, who were, of course, making a great outcry lest the little orphan should be lost, the mother flew down from the other side of the house, and without the least hesitation, seized her little one by the leg and carried it off to the top of the high tree from which it had fallen a week before. I regard this as rather a curious circumstance; the power of wing in the old bird being not the least remarkable of its interesting features."—The following somewhat similar instance of sagacity is related by Wilson of the Ruffed Grouse (*Tetrao umbellus*) :—"The young leave the nest as soon as hatched, and are directed by the cluck of the mother, very much in the manner of the Common Fowl (*Gallus variabilis*). On being surprised she exhibits all the distress and affectionate manœuvres of the Common Colin (*Colinia vulgaris*, Nuttall; *Perdix virginiana* of Latham), and of most [many] other birds, to lead you away from the spot. I once started a female Ruffed Grouse with a single young one, seemingly only a few days old; there might have been more, but I observed only this one. The mother fluttered before me for a moment; but, suddenly darting towards the young one, seized it in her bill, and flew off along the surface through the woods with great steadiness and rapidity till she was beyond my sight, leaving me in great surprise at the incident." If I mistake not, Audubon mentions a parallel case of an American species of Nightjar. Other birds, as the wild Ring Duck (*Anas boschas*, Lin.), the Tufted Woodard (*Dendronessa spansa*, Sw.), and the Common Gallinule (*Gallinula chloropus*, Will.), must also occasionally carry their young in their bills, as they are all known to build more or less frequently many feet high in trees, &c. It is said that the Common Rusticol (*Rusticollia vulgaris*, Vieill.), has been seen to transfer its young by flight.

Turning from young birds to nests, I shall here notice an assertion made by a

* The trees in the Escule family (*Esculaceæ*) are vulgarly confounded under the name Horse Chesnut: they have, however, no affinity with the Chesnut (*Castanea*), which is in the Hazel family (*Corylaceæ*), which, among other genera, contains the greatest glories of the British forest, the Oak and the Beech.

writer in the *Analyst*, concerning the nidification of the Rose Mufin (*Afedula rosea*).^{*} In an amusing article on this species, in No. IV., vol I, p. 258, the writer refers to the assertion made by Selby and Mudie, that the nest is sometimes found with *two* openings, and proceeds to disprove this by reasoning. I am happy to be able to bring forward an instance proving the truth of the assertion, as stated by the former of the two eminent Ornithologists just mentioned:—"In one of your former letters (says Selby) you ask if I ever saw the nest of the Longtailed Tit furnished with two holes or entrances; two such instances I have met with in my own plantations; and in each, when the bird was sitting upon her eggs or callow young, the tip of the tail generally protruded beyond the upper or rather hinder orifice. One of these nests was kept for some time, but the access of moths obliged me to consign it to the flames." This interesting fact is an additional instance to the many already on record, of the danger of reasoning from mere negative evidence or preconceived notions, instead of from actual observation; the former is a foundation of sand, the latter of rock.

I shall conclude this miscellaneous communication by expressing my pleasure at seeing the zeal and success with which the principles of ornithological nomenclature, as explained in Nos. XII. and XIV. of *The Analyst*, have been brought into practice in *The Naturalist*: and I hope that the barbarous and unscientific mode of naming birds adopted by Bewick, and other authors of the old school, with all errors of science, however high the authority to uphold them, will sooner or later be buried in oblivion. And, let me ask, is it not quite as easy and much more satisfactory to call the *Accentor modularis*, Hedge Dunnock than Hedge Sparrow, the *Merula vulgaris*, Garden Ouzel instead of Black Bird, and the *Sylvia melodia* Yellow Treeling instead of Yellow Wren?†

There never has been, and perhaps never will be, a new discovery, without exciting at the outset some degree of opposition, arising sometimes from ignorance, prejudice, self-interest, and indifference. The present subject seems, however, to have pretty nearly overcome all these obstacles; and although (as Bell truly says in his beautiful work on British Quadrupeds, p. 146,) often much underrated, terminology now receives its due share of attention. Agreeing, as I do, with a zoological writer of the present day in the opinion that "incalculable benefit

* Longtailed Tit, and *Parus caudatus* of old writers.

† I perceive, at page 34, that Mr. Blyth objects to the generic name, Treeling, which I have adopted for the genus *Silvia*, and proposes "Pettychaps," which Yorkshiremen, when they hear, generally turn into *Prettychaps*. This name is not euphonic enough for so handsome and familiar a bird. If adopted at all, it should be Pettychap, (See Shaw's *Gen. Zool.*), similar to Redwing, Longshank, Thicknee, which we do not call Redwings, Longshanks, Thicknees. According to Rennie, (see *Quarterly Journal of Agriculture*, No. 33, p. 43), these birds are called, in Scotland, *Busket Ledly*, on account of their elegant appearance.

will accrue to the science of Natural History in general, from dispassionate discussions on the true principles of nomenclature," I hope that Mr. Blyth will soon redeem his promise at p. 34, and "take the subject in hand" himself.

The *British Song Birds*, lately published, is, I believe, the first English work in which the principles have been, not only acknowledged, but *acted on*. Most of the names are unexceptionable, though there are two or three oversights—as *Phœnicura* for *Ruticilla*, and Brakehopper for Locustel. The English names of the genera should, also, have preceded the Latin, instead of coming after : for, in an English book, the English names are the most important.

C. T. WOOD.

Campsall Hall, near Doncaster.

[Several of our Correspondents entertain views widely opposed to each other on the disputed point of a reform in the nomenclature of British Ornithology. We submit their communications on this subject to the readers of *The Naturalist*, in the hope that suggestions may be elicited in the discussion which will prove interesting to Ornithologists.—Eds.]

ON THE RING PIGEON.

I FIND Mr. Neville Wood rather sanguine in his hopes of domesticating the Ring Pigeon. I have known many attempts at it, which all failed. I never could learn that any one of the birds, though taken from the nest and reared up to an age when it might be expected, were ever heard to coo. It is a well-known fact that a bird of this species taken, with its fellow (which soon died), from the nest, was brought to a farm in the neighbourhood of Chichester, where every facility confinement could afford was given it to mate with a common Pigeon, without success. At eight years of age, it being proved to have consumed as many peas as would have brought the sum of ten pounds in the market, an order for its decapitation was given forthwith.

J. C.

REVIEW.

GERMAN PERIODICAL.

Wiegman, *Archiv. für Naturgeschichte*. Zweiter Jahrgang, 1, 2, und 3er, Heft.

We now proceed to redeem the promise given in our last number to extract what appears to be most interesting in the above work, and at the same time to give a general idea of its contents.

The first paper of the first part is an elaborate monograph by Opatowski, *De familia fungorum Boletoidaeorum*, three species of which he separates and forms by them two new genera, which are characterized. The remainder, containing the typical genus *Boletus*, he divides into sections and subsections according to the structure of their tube. The species are described very fully, and the synonyms carefully introduced.

We have next *Contributions to the History of the Hymenoptera*, by Chr. Drewson and F. Boie. This paper will necessarily be appreciated by the Entomologist from the glimpses it gives into the history of a tribe of insects of which we as yet possess but a very imperfect knowledge. The time has at length arrived that due attention commences to be paid to the pupivorous Hymenoptera, which from the exceedingly important function they perform in the economy of nature, and the powerful influence they exercise over all the other orders of insects, certainly have not merited the almost gross neglect they have experienced until within these few years. Gravenhorst's labours, in conjunction with those of his worthy associate, Nees von Esenbeck, have reduced to something like systematic order the chaos in which these insects had been left by all their predecessors; but even their works require revisal. Here we have the more important portion of the history of a few recorded, which exhibits them in the exercise of their prescribed functions, and this with the exception of some scattered observations in the works of Gravenhorst, Nees, and Curtis, in the papers of Haliday and Walker, and in the pamphlet of Bouché, is all we as yet know of their "private history." We present our compatriot entomologists with the substance of this paper in the hope that it may induce those who possess the opportunity, or who happen to catch such evanescent facts to record them; and we invite them to do so, for our pages will be always open to their use. It is almost only hence that we can expect to attain a more natural arrangement of this extensive host than it has been possible hitherto to construct.

The following facts we find here recorded:—

Ichneumon sicarius, Grav. Both sexes from the pupæ of *Lithosia rubricollis*.

Ichneumon fossorius, Müller. The female, on the 15th of September, from the pupa of *Noctua Typhæ*.

———— *oratorius*. The male, in summer, from the pupa of *Noctua festiva*.

———— *saturatorius*. Female from the pupa of *Noctua phragmitidis*.

They here remark the curious fact of the *Ichneumon* and the Moth being developed at the same time, but that the caterpillar of the latter is only to be seen nine months later; they, therefore, suggest that the eggs of the *Ichneumon* are probably deposited near those of the Moth, and that the larvæ of the former subsequently work their way into the body of the caterpillar, or that there is a second brood of the *Ichneumon*. The latter is certainly the most plausible supposition, and it is not improbable that the *Ichneumon* is not confined to the caterpillar of one moth, as we shall observe under *Pimpla rufata*, and that thus the exigency is met.

Ichneumon lineator, Fab. Male, on the 4th of June, from the pupa of *Geometra elutata*.

———— *monitorius*, Panz. Male and female, from the middle of June to the end of July, from the pupæ of *Noctua pronuba*, and but one parasite to each.

———— *ambulatorius*, Fab. On the 13th of July, from a pupa of *Noctua polyodon*.

———— *vadatorius*. Female, on the 10th of June, from the pupa of *Noctua pronuba*.

———— *culpatorius*. On the 20th of June, from the pupa of *Noctua cucubali*, which had over-wintered; in this the wings were tinged with a dark cloud: and on the 29th of August, from a pupa of the unknown caterpillar of a *Noctua*, which had changed on the 29th of the same month, in which the wings were silaceous.

This difference of colour in the wings arose probably from the different quality of the food of the larva, a fact analagous to which we observe in many of the lepidoptera, which feed on two different plants, and producing a similar effect in the colour of the imago.

Mesoleptus limitarius, Grav. Upon *Nematus ventricosa*, of Klug, which feeds upon the currant.

———— *exornatus*, Grav. Upon a new *Nematus* described in both sexes but without a name, which feeds upon *Pinus abies*.

Tryphon exstirpatorius, Grav. Upon a *Nematus* (the *Tenthredo Betulæ* of Fållen), which feeds upon a willow.

Trogus alboguttatus, Grav. The male from the pupa of *Noctua pudibunda*, on the 15th of June, and the female on the 8th of July.

———— *flavatorius*. The male and female, in June and July, from the pupæ of *Sphinx Salicis*.

Lissanota murina, Grav. The male, on the 23rd of April, from the pupa of *Noctua gothica*, and the female, on the 7th of May, from the same.

Bassus ornatus, Grav. The male from caterpillars of *Noctua Chenopodii* found on *Salsola kali* on the sea shore, in September, the parasite making its way out before the caterpillar could fully change into the pupa. Each appeared to be destroyed by only one, and some of the ichneumons formed even an earthy envelope like that contracted by the moth.

Pimpla rufata, Grav. In the autumn from pupæ of *Vanessa Urticæ*, and in the summer from pupæ of *Sphinx Ligustri* which had over-wintered.

Exetastes clavator, Fab., and *E. osculatorius*, Grav. From the very similar pupæ formed by larvæ which had fed upon caterpillars of *Noctua oleracea*.

Campoplex difformis, Grav. Female, in June, from the pupa of *Tortrix Ameriana*.

——— *pugillator*. On the 24th of May from the pupa of *Geometra obscurata*, and on the fifth of June from the pupa of *Noctua marginata* and that of *Geometra brumata*.

These, they think, may also be specifically or sub-specifically different.

Campoplex capricornis. Males and females in number from larvæ which had preyed gregariously upon immature caterpillars of *Noctua typhæ*, which they deserted in June, enveloping and transferring themselves within the leaves of plants.

Paniscus glaucopterus, Grav. From the pseudo caterpillar of *Cimbex femorata*.

——— *testaceus*, Grav. From the pupa of *Cerura vinula*; the females were found to be developed later than the males.

Anomolon flaveolatum, Grav. From pupæ of *Noctua batis*.

Ophion obscurus. Female on the 24th of July, from the pupa of *Noctua leporina*.

——— *luteus*. Male and female on the 10th of June, and the female on the 20th of August, from the pupæ of *Noctua Cucubali*, *Noctua Absynthii*, and *Noctua innartri*.

The authors suggest that these Ichneumons may be specifically different, although not apparently so, founding their supposition upon the development from different insects; but we have already seen, under *Pimpla rufata*, that this is not universal.

Chelonus irrorator. On the 10th of June, from the pupa of *Noctua psi*, which had over-wintered. This has been, but incorrectly, considered a British insect.

The doubts of the authors as to the specific identity of apparently identical species developed from different insects, cannot be admitted. It is no more than

analogous to the fact of many of the Lepidoptera feeding upon different plants. We cannot, it is true, yet trace it to any known law; but it is not enveloped in greater obscurity than the other well-known circumstance, also corroborated in some of the above observations, of several species, and even genera, of parasites feeding upon the same insect. The most extraordinary instance adduced above are those of *Mesoleptus*, *Tryphon*, and *Paniscus* feeding upon *Tenthredinidæ*. Could some parasite be found to infest *Athalia spinarum*, the agriculturist might then hope for a permanent check to one of his greatest enemies; but we are sadly afraid that the mere acumen of Entomologists will never elaborate an effective remedy for the devastation amongst turnips until nature lends her help by the abundant propagation of a destructor of the destroyer in the shape of an insect parasite.

The authors, also, partially characterize a new genus (*Gravenhorstia*) for the reception of a new insect, allied to the *Ophions*, developed in May from the pupa of *Bombyx Trifolii*: as this moth is common with us, the Ichneumon may also be found, and we therefore give the characters.

GRAVENHORSTIA.—Boie.

Head with four impressions on the face beneath the antennæ, placed in pairs, the two upper ones half-moon shaped, and between them a small tubercle. *Antenna* of the length of the abdomen. *Scutellum* very convex, triangular or sub-quadrangular. *Wings* short. No *cell*. *Posterior legs* long; tarsi incrassate. *Abdomen* petiolated, as long again as the thorax, laterally compressed, enlarging towards the apex. *Ovipositor* scarcely exerted.

G. picta, B.—Black. *Face and orbits of the eyes* yellow; tubercle of the face, black. *Antennæ* reddish yellow, the two first and fourth joints black above. *Thorax* very convex, punctured, opaque, pubescent, with twelve yellow spots, of which two large triangular ones on the prothorax, one on each side, two smaller ones in stripes before and beneath the wings on each side, and the six others as large as the first beneath the coxæ, which are very shiny. *Scutellum* also yellow. *Wings* yellowish with brown stigma. The anterior and intermediate *legs* of a brownish yellow; and the posterior pair, with the femora and apex of the tibiæ, brown. The *Abdomen* shining, with seven broad yellow bands placed on the margins of the segments. *Length* from eight to ten lines; females larger than the males. *Habits* resemble those of *Ophion*.

The next article is a *Systematic Investigation of the Family of the Bostrichidæ*, by Dr. Erichson, a name which ensures the value of the monograph from being so advantageously known as that of the author of the genera *Dyticeorum*, an inaugural Dissertation, and the Paper upon the *Histeroides* of the Berlin

Royal Collection published in Klug's *Annals of Entomology*. Our space does not permit us, at the present moment, to give an abstract of its contents; but we propose returning to the subject in a future number.

We have next "Extracts from the Observations of Swedish Naturalists," by C. R. A. Krassow, containing a multiplicity of short notices deeply interesting to the northern European zoologist; but the remaining paper is a monograph of the genus *Rhinolophus*, amongst the bats, by Temminck, whose investigations have led him to conclude that the two warts above the os pubis, which are not present in the female of one year old, barely incipient in the second year, and only fully developed in the third year, are not nipples, but appendages for the secretion of a fat offensive substance. He reduces Dr. Horsfield's seven Javanese species to three, and introduces, as new, three from Java, one from Africa, two from Amboina, and one from Japan, thus encreasing the number of the species to seventeen, exclusive of three very doubtful ones.

The most interesting paper in the second number is from the novelty of its subject, that by Lichtenstein, containing his observations upon living Cephalopoda, made during a short visit to the coast of the north of France in September, 1835. Here, for his and his companion's entertainment, the fishing fête called the Pouglièche, was celebrated, his friends remarking that Meckel (the comparative anatomist), had upon his visit in the year 1824, considered the sight of such a vast multitude of living animals thus drawn in the fullest animation from the recesses of the deep and exposed to examination, as one of the greatest rewards of his whole excursion, and which Lichtenstein corroborates. It was in the vicinity of Montpellier, upon the coast between Cette and Agde, that the party under the guidance of Professor Dugès and Dr. Fage, passed the night that they might witness at day break the interesting sight. Three large nets, each 120 toises long, had been cast the preceeding evening at a considerable distance from the coast, and were drawn in by a multitude of poor country people, chiefly consisting of old men, women and children, attracted by the hopes of participating in the capture. The tumult of the swimmers exhibited itself even at a distance upon the gradual contraction of the bag of the nets, each of which brought from ten to twelve hundred weight of fishes, sepias, crustacea, and alcyonia, to the shore. The fishes consisted chiefly of the usual species abundant at this period, of Sparus, Clupea, Mullus, and Mugil; amongst which there were occasional individuals of Squalus Ferox, Syngnathus Hippocampus, and Raja Oxyrhynchus. But the Sepias from their size, multitude, and remarkable conduct attracted the chief attention. There were more than two hundred individuals of the genera *Heledon*, *Sepia*, and *Loligo*. Each species exhibited motions which were as remarkable in themselves from their novelty as in their difference from each other. The *Heledones* cast headlong out of the net, endeavoured to escape from the mass, and actively exerting themselves, crept towards the sea; the majority of the *Sepias* had a half swal-

lowed fish sticking in their bill, and made a noise something like the sneezing of a man. The *Loligos* leaped up higher than any of the fishes, and with a tolerably well determined direction towards the water, so that several of them were lucky enough to escape.

The *Heledones* always cast themselves with facility upon their ventral side; they then spread out equally their eight arms, four upon the right and four upon the left, thus distending their broad connecting membrane: the anterior ones stretched their points far forward, clinging even to the sand with certainty; the points of the following pairs alternated, in regular succession, upwards and downwards, the suckers fixing themselves on each descent, and drawing the body after them. The average speed in fresh specimens was about seven feet a minute; the motion was constant, without interruption, like that of snails. When they approached nearer to the water, and got upon the flattened and moist sand, there was a very perceptible increase of speed; and as soon as they came to the descent of the shore they raised their heads, the forehead arched itself between the glittering eyes, an active motion was observable in the previously tranquil sack-shaped body; the incisions of the mantle, by a repeated rapid opening and shutting, drew air into the bag until the body resembled an expanded bladder, and, raising this suddenly, and casting it forward, the creature rolled the last three feet of its journey to the water with a speed which it was impossible to intercept, in case the flowing of the waves accidentally came to its assistance.

The motions of the *Sepias* were totally different. We have already noticed their sneezing noise; this ceased when they were left dry, but was resumed upon the influx of water. Their arms, which, with the exception of their two raptorial arms, are but short, were incapable of removing them from the spot, and even the head maintained its fixed position towards the bag. Upon their increasing exhaustion, they ejected a quantity of a thick, scentless, inky liquid, after which they died. This, between the fingers, felt more fat than clammy, but perfectly dissolved, both in salt and fresh water, without presenting an appearance of fat upon the surface. Soap would not remove the stains upon linen, when once dried. The juice of the *Heledones* was quite as black but not so thick, and much less in proportion; besides which, it differed by having a decidedly musky smell. Unfortunately, during his inspection of the preceding, the *Loligos* had all died; they were from about eight to ten inches long, and varying from three to four pounds in weight. They did not, like the *Sepias*, eject their fluid upon dying, but upon dissection cellular bags were found filled with it near the liver; it was much less in quantity, less deeply coloured, but of a similar consistency to that in the *Sepias*.

There are some interesting observations, by the same author, upon *Syngnathus hippocampus*, which, with other notices, we must reserve for our next number, as our space, at present, is exhausted.

EXTRACTS FROM FOREIGN SCIENTIFIC JOURNALS.

1.—MR. M. A. LEFEBVRE, in a memoir contributed to the Entomological Society of France, mentions having observed, while travelling in various parts of Egypt, particularly in an excursion to the Oasis of Bahrych, an orthopterous insect, which lives in the sands perfectly destitute of vegetation. He examined several species, each differently coloured according to the nature of the soil, which they so exactly resembled that it was difficult to perceive them. What, therefore, is the nourishment of animals like these, organized to exist upon living prey? They are found in localities in which no herbivorous insect could exist, and Mr. Lefebvre has never discovered the slightest vestige of vegetable or animal matter with them. On the other hand, their elytræ and wings, being ill adapted to flight, prevent the idea of their migrating like Crickets. Are they, then, reduced to subsist upon the prey conveyed to them occasionally by the winds? or do they live by devouring each other? These are the questions which he has not been able to resolve, notwithstanding his most patient and minute observations of this singular insect. He has named it *Eremiaphiles*, from its peculiar habitat: some species have already been figured in the great work on Egypt, but without descriptions. Lefebvre has added several others, one particularly remarkable in the articulations of the tarsi, which are *four* in number on the anterior feet, and *three* on the two other pairs. This fact is extremely important, and offers a new objection to the classification of entomology by the tarsi, which has also been shaken by several analogous facts, and must ultimately be abandoned, notwithstanding its convenience. The above observations have induced Lefebvre to constitute of this species a new genus, which other general characters tend to induce. We regret extremely that we are not, at this moment, able to give a more detailed description of this extraordinary paradox in entomology.

2.—ON THE APPEARANCE OR DISAPPEARANCE OF PLANTS IN CERTAIN LOCALITIES.—Mr. Weinmann, inspector of the Imperial Gardens of Pawlowsk, in Russia, enumerates several striking instances of the above singular circumstance, which hitherto appears quite inexplicable, or not observed by Botanists in general. He states, among other occurrences of a similar nature, that during an uncommon season of drought, a lake in the environs of Pawlowsk became dried up, and its basin was shortly clothed with vegetation, but instead of the *Juncus effusus*, *J. lampoocarpus*, *J. tusonius* and others of that family, which previously grew abundantly on its banks and sides, the dessicated bottom of the lake produced nothing but the *Scirpus acicularis*, a plant unknown altogether in that locality. When the severe frost destroyed vegetation the *Scirpus acicularis* totally disappeared, and has not again vegetated on this spot.

Some other plants which were common in the environs of this city eight years

since, such as the *Turritis glabra*, the *Chenopodium hybridum*, and the *Triticum pennatum*, no longer are to be found there. The *Carex microstachya* was abundantly found eighteen years since in the environs of Pawlowsk, but has now totally disappeared.

Mr. Weinmann enumerates the following plants as no longer existing :—*Lynosurus cristatus*, *Illatine hydrapepa*, *Barbula rigida*, *Fontinelis foliata*, *Anthoceros punctatus*, and *Drabæ luteæ*. It would be highly interesting, if analagous facts are known in this country, that some of our able contributors would favour us with their observations on this extraordinary phenomenon.

3.—Mr. CORDA, of Prague, has made some discoveries of animalculæ living in innumerable societies, near the hot springs of Carlsbad, in Germany: they are all of singular and novel forms. The presence of these myriads has often inspired a repugnance to invalids drinking the waters: he recognised forty-two new species. Mr. Ehrenburg has pursued similar researches, and added eight other well characterised species, mostly unknown; he calls them—*Navicula striatula* (of Purpin), *N. umbonata*, *N. hippocampus* and *striata* (these two are also found in the Baltic Sea), *Trustulea appendiculata* (Agarh), *Navicula quadricostata*, *N. arcus*, *Monas violacea*. These four last species inhabited the Carlsbad water, and are found no where else.

4.—MR. P. E. BOTTA, the travelling Naturalist of the Paris Museum, writes from Tor that he will shortly forward to France the collection he has already formed: he is about to explore a portion of Egypt and Arabia, and is now directing his steps towards Djidda and Mocalla, where he will embark for the Yémen. The information he had acquired respecting these countries, so rich in objects of Natural History, induce us to hope that he will be able to proceed so far into the interior as to collect a rich harvest of specimens hitherto but very imperfectly known, from the appalling difficulties which attend European travellers in those expeditions. The experience, knowledge, and zeal of this young Naturalist, who has already traversed many points of Africa, and completed a voyage round the world, render it likely that science will be immensely enriched by his present researches.

ALCEDO ISPIDA.

FAMILY.—SYNDACTYLI.

GENUS.—ALCEDO.



THE KINGFISHER.



BY ROBERT MUDIE.

GENERIC CHARACTERS.—Bill long, straight, angular in the section, thick at the base, rarely depressed, trenchant in the tomia, and pointed at the tip. Nostrils basal, lateral, pierced obliquely, and nearly closed by a naked membrane. Feet short, placed far backward, tarsi rather stout and rounded, a portion of the tibiae bare of feathers. Four toes, the hind one enlarged at its base, the external and middle front ones of equal length, and united as far as the second joint, the inner shorter, and united to the first joint. Tail very short and rounded. Wings of mean length, rather broad, hollow, and rounded, the third quill being the longest.

The species of *Alcedo* are rather numerous, and there are some differences in the form of the bill and the structure of the feet. Some have an enlargement on the middle part of the lower mandible; others have the bill a little curved, and are less aquatic in their habits than the others. These last have the toes united to the third and second joints, and the inner one little more than rudimental. The greater number of the genus are found only in tropical and other warm countries, but there is one which inhabits Europe as well as Asia and Africa. That one is

THE COMMON KINGFISHER (*Alcedo ispida*), of which we have annexed a figure, drawn and coloured after nature, in that attitude which the bird assumes when it has captured a small fish, which it can swallow entire without quitting the wing. This figure will give a notion of the shape and colours of the bird, and thus spare us the tediousness of verbal description; and both the form and the colours are so unique that, once known, the Kingfisher is never forgotten.

The Kingfisher is a resident British bird, and pretty widely dispersed over those parts which are suited to its habits; but it is no where very abundant, and it is rarely seen in proportion to its actual numbers. Its haunts are the rich and shaded banks of streams and rivulets, being seldom seen where the ground is open and bare, and never running on the sand-banks or beaches. The foot is not adapted for walking on the ground, both on account of the backward articulation and of the peculiar structure of the toes. This is the case with all syndactylic feet: they amount, in fact, to little more than a foot of two toes, one to the front and the

other to the rear ; and these toes are articulated to the tarsus on the same plane, while the union at the base of the front ones, and the enlargement at that of the hind, form a base of considerable extent. The foot is thus a resting foot—a passive foot, as it were—and not an active one. The backward articulation accords well with this use of the foot ; for when the bird rests on its feet, the axis of the body is much elevated forwards, and the weight, by that means, is concentrated upon the feet, which gives greater stability with the same extent of base than if the axis of the body were horizontal. The shortness of the tarsus further contributes to the same purpose, and the strength of that part of the leg is calculated for enabling the bird to bear its standing position for a long time. The syndactylic foot, ill-formed as it appears to be for active purposes, is the very model of a foot in its way ; and whether we examine its own structure, or the manner in which its position concentrates the weight of the bird, we cannot help noticing that, among all the variously formed feet of the feathered race, this is the one best calculated for enabling the owner to erect the wing and yet keep vigilant watch for its prey. Of all syndactylic birds, the Kingfishers are the most aquatic in their feeding, and the shortest and roundest winged ; and, therefore, we might be prepared to find this foot in the greatest perfection in them.

And the habit is beautifully true to the structure. For in those warm and stillly days when not a breath of wind rustles the foliage or breaks the glassy surface of the brook, the Kingfisher may be observed sitting, for hours together, upon some withered branch or water-encircled stone, until a fish comes within the range of its vision. Then off it darts, with the rapidity of an arrow and the radiance of a meteor, and seldom misses its aim. If the fish is small it is swallowed during the flight, but if it is too large for that purpose, (and the bird in consequence of the breadth and hollowness of its wings can rise, even from amidst the water, with a larger fish than one would be apt to suppose), then the bird betakes itself to some rock, stone, or firm portion of the bank, where it speedily kills the fish by hewing into the skull with its strong and powerful bill. After this, the trenchant edges of the same instrument may soon divide the fish into such portions as can be swallowed, and the feast is then over. As is the case with almost, if not quite, all birds that can bear abstinence for a long time, the Kingfisher is very voracious when food can be obtained ; and it seems to be a pretty general law that birds which feed on fish eat more than those which feed on most other animal substances.

Though the Kingfisher often plunges fairly into the water after its prey, its plumage is not wetted or ruffled. Beautiful as its colours are, its plumage partakes much of the nature of that of the aquatic birds properly so called, which launch themselves upon the water, or dive and duck through its substance. We have already said that it brings the connection of the syndactylic birds down to the water, were the chain appears to be taken up by the Terns among web-footed

birds ; and as it holds nearly the same place among those birds which feed over fresh waters upon the wing, as the Auks and Puffins do among those that swim and dive, so there is no small resemblance in some parts of the economy. It builds in holes of the banks, which holes it excavates for itself. The foot is, indeed, a very efficient digging foot, much better than if the tarsus were larger, and the toes more produced and free. The eggs are, however, more numerous than those of the sea-birds, which the Kingfisher resembles in its breeding places and some other of its habits. They vary from four to eight, usually of a pure white colour ; and as the birds do not walk on the sludgy surfaces the eggs are not soiled by their feet, as is the case with those of many lake and river birds. It is said that the Kingfishers are very prone to take possession of the holes of the small aquatic mammalia and trim them for nesting places ; and some allege that these avenge the ejection by eating the eggs of the birds. This last is not, however, very practicable, as the eggs are seldom, if ever, without one of the birds upon them ; and if the birds are able to take possession, they are, of course, able to keep it. It is true that the number of birds that are seen bears but a small proportion to that of the eggs ; and we know that, in most cases, the numbers of the eggs of birds bear a proportion to the enemies or other casualties to which they are subject. But we have no certain knowledge of the enemies of the Kingfishers, or of the casualties that may destroy them, either in the young or the adult state. It has been said that the eggs are frequently addled or the unfledged young drowned, by the floods of the streams in the banks of which the nests are placed ; but the time when these birds breed is that at which floods are the least frequent. The probability is that the cold of winter, and the impossibility of finding food when the streams are sealed up by the frosts of that season, are the real causes of the comparatively limited numbers of these birds in the colder latitudes. This is, in so far, rendered probable by the fact that, even in those places where they are most likely to be found, Kingfishers are less frequently seen in the summer than in the winter. In summer they ascend the streams, near their sources, especially if these are in rich and wooded plains, because at this period and in such situations the smaller fishes are usually numerous ; but toward the close of the season the small fishes descend, and when winter fairly sets in, the birds are driven to the broad waters, where they are not only obliged to be more on the wing for their food, but are also more easily seen, from the leaves having fallen.

It is probable also that, notwithstanding the compactness of their plumage, the Kingfishers are more susceptible to the weather than almost any other of our resident birds. The fact of the single species in Europe, and the great number of species (as many as between sixty and seventy, leaving out the less aquatic ones, which make eight to ten more) that are found in tropical countries, would go far to establish this supposition. But there is a physiological argument which is at once more conclusive and more important. In all cases in nature there is an adaptation

of the prey to the prey, which brings them to inhabit the same places, and to be abroad at the same times. Now fresh-water fishes, especially those that frequent the smaller streams, which are liable to be acted on by the weather to their whole depth, are known to be so exceedingly sensitive that the presence or absence of the sun, or the shifting of the wind from one point to another, will send them all quiescent to the bottom of the stream or bring them in activity near to the surface, according as the change is the one way or the other.

Now, in order to adapt them for the capture of prey so sensitive, it is necessary that the birds themselves should be acutely sensitive to the same changes; and thus they who have had the best opportunities for observing state, that, when the weather renders the fishes quiescent, the Kingfisher takes its station upon a stump or a stone, where it "bides its time" in the patient manner that has been described. But, on the other hand, when the state of the weather puts the fishes on the alert, and makes the smaller ones sport near the surface of the water, the Kingfishers betake themselves to the air, and dart abroad over the surface with extraordinary rapidity, considering the shortness of their wings.

At those times, however, they are solitary in their feeding, and so many as two are never seen in close company or very near to each other. Even the males and females have no sort of intercourse or recognition of each other, except in the pairing season, and then they are cryptogamous as well as monogamous, and do not appear at the same time. Their feeding grounds are also often at a considerable distance from their nesting places; and they are generally in more retired situations, because when they meet, the nuptial cave affords concealment. There is no formal building in the nest, but it often contains a considerable quantity of fish bones, which, in all probability, the birds discharge in castings. At this time both birds repose in the nest-hole during the night, but as they arrive and depart with great celerity, they are seldom seen, and the nest is not often found. The rearing of the brood is long and laborious, as the young do not quit the nest until they are so far fledged as to be able to make their way, and find their own food, over the waters. When they arrive at this state the whole family separate, never, in all probability, to meet again. In fact, notwithstanding the exquisite colours and brilliant gloss of their plumage, Kingfishers are solitary, and, in a sentimental point of view, dismal birds; their cry is harsh and unmusical, and their nesting places are offensively filthy. Brilliant plumage does not appear, indeed, to be an indication of any quality of birds which renders them valuable or even interesting to man, but it is probable that it, in some way, renders them more susceptible to atmospheric and solar action. We may have another opportunity of adverting to this curious point.

ON THE NATURE AND USES OF THE PRIMÆVAL VEGETATION OF THE EARTH.

BY ROBERT DICKSON, M.D., F.L.S.

IN a former article (p. 146) we made some remarks on the geometrical principles which had been observed in the construction of the members of the leading divisions of the vegetable kingdom, and on the inferences which might be thence drawn respecting the Deity and his works. If we turn our attention to the principle which regulates the distribution of plants over the surface of the globe, and assigns to each country its precise and peculiar kind of vegetation, we shall not find it less worthy of our consideration, or less fraught with lessons of wisdom and proofs of benevolence. The prevailing or predominating species of plants which form the vegetable covering of the earth, give to each country its characteristic aspect, determine the nature of the wild animals and insects which frequent it or live there, and, as Humboldt justly remarks, “produce the most important effects upon the social state of the people, the nature of their manners, and the degree of development of the arts of industry.”

Let any one be conveyed from Britain to some island in a tropical latitude, and at the first glance he will perceive that he is surrounded by vegetable forms very different in appearance and structure from those of his native land. Instead of the Oaks, the Ashes, the Elms, and the Sycamores, with their enormous stems and wide-spreading branches, sometimes covering nearly a quarter of an acre, he will strain his eyes in looking upwards at the leaf-crowned summit of some slender branchless stem that seems to pierce the sky. Perchance he may recognize forms akin to the Ferns of his own country, but surpassing them in size and variety as much as the lakes of America and the mountains of India surpass in vastness and height those of Europe.

Again, let him be conveyed to the polar regions: there he will find a few trees—such as Firs and Birches of a dwarfish size—braving the rigors of these climes, but an utter absence of those shrubs and flowers of larger growth, which make our woods and lawns so gay and fragrant; the flowers to be there met with being such as are never seen in Britain, save on the summits of our loftiest mountains.

If the individual be possessed of an inquiring and reflecting spirit, he will soon discover that the most general and influential of the causes which occasion these different and opposite phenomena, is temperature; and might be led to imagine that if some convulsion of nature were to effect a change in the temperature of Britain, he might see its surface clothed with the vegetation of the tropics, if that change consisted in an elevation of temperature; or, if the reverse, he might see the alpine vegetation descend from the mountains and inhabit the plains, or mi-

grate from the north, and displace the tender occupants of the soil, as the hardy hordes of Scandinavia displaced the effeminate rulers of Italy and Gaul.

Now, this is no groundless speculation, or imaginary occurrence : for once a vegetation similar to that of the tropics flourished where Britain now stands ; though the forests of which it consisted were never seen by human eye, and the convulsions by which it was destroyed involved not, in their tremendous desolation, one being of that race which now inhabits it, and to render it fit for which, many a mighty commotion took place, and many an instance of creative power testified the provident and benevolent intentions of their Almighty Author. It was by means of these forests that the atmosphere was rendered suitable for the respiration of the higher animals, such as quadrupeds and man,—and by their submersion those reservoirs of carbonaceous matter—coals—were secreted for the use of future ages.

The primary, the universal function of vegetables appears to be the elimination or formation of carbon, whatever secondary or temporary uses they may answer ; and the primæval vegetation of the world flourished under circumstances highly favourable to their fulfilling this end. Indeed, so far as we can ascertain, there was no other object in view in their early formation ; and hence they attained a size even unknown in the tropics in the present day. How perfectly they accomplished this object, the remains of them, existing under the surface of the earth at various depths, and in various states and degrees of preservation, sufficiently attest. A careful examination of the external form and internal structure of those which have retained their original constitution, or even of those which have undergone an alteration, and had the whole of their natural elements removed and siliceous particles substituted in their place, enables us to conjecture with tolerable accuracy the particular tribes of plants which grew in those remote antediluvian ages. (See Lindley and Hutton's *Fossil Flora of Great Britain*, the work of Mr. Witham, papers by Mr. Nicol in Jameson's *Journal*, and Brongniart's *Histoire des Végétaux Fossiles*.) The greater number of those which are discovered in the most ancient coal formations belong to the vascular cryptogamia, comprising the Ferns, Horse-tails, &c., but of a size far surpassing any now growing ; and among the more recent coal measures are found Ferns, Palms, Cactuses, Cycases, and Pines or Firs. The land on which these grew, by alterations in the level of the surfaces,—whether by upheaving of volcanic masses, forming islands or continents, and causing displacement of the waters of the ocean, or by a sinking of their place of growth, from earthquakes or other convulsions,—became submerged, and the pressure of the sandy deposits above them, aided by the superincumbent water, and the slow action of time, converted the vegetable structures into those great elements of utility—coals, which are so extensively wrought in this country, to which they are justly considered of more value than all its gold mines to Peru.

Had they, when submerged, remained for ever in that situation, they would

have been alike unknown and unserviceable to man, but subsequent commotions brought them again near the surface, which, after acquiring a fresh vegetable coating, suffered another depression and subjection to the compressing powers, to be at last consigned to their present position, the most favourable for their beneficial employment that could well be conceived.

What infinite occasion have we to admire the beneficence of the all-directing Providence, evidence of whose guiding of the storm is not wanting amid even the most terrible convulsions of nature ; for, when the framework of this globe appears ready to loosen and dissolve itself, and all the elements seem to blend themselves in disordered and confused mixture, yet order and design become manifest in the result. But for this regulating, this controuling power, by what computation of chances, equal indeed to infinity to one, could we have had our coal-strata and iron-ore occurring in the same district, in so many instances, as we find them in Britain ? If the comforts and interests of the present inhabitants of the earth were thus prospectively provided for, so long anterior to the occurrence of their wants, is it probable that the interests or comforts of future ages will be neglected by the omniscient, the omnipotent, and the eternal Creator ? These observations are here introduced because some, forgetting the attributes of Him, to whom they owe every sense, every faculty, and every gratification of these which they enjoy, have indulged in fears or doubts for the welfare of the future occupants of the globe, and supposed if the present coal-measures were exhausted, none would be accessible to them. Now, without speculating on the unascertainable point, whether or not the future inhabitants of the globe shall require coals, we may, by observing what is taking place in both the old and new worlds, perceive provision making for a store of this material. When we consider the almost boundless forests of America, India, and other tropical countries, occupying stations rarely trod by the foot of man, we might be tempted to think they were of no use, but were mere cumberers of the ground. Yet, independent of the great influence which they exert over the humidity, the temperature and climate of the regions where they flourish, being the grand sources of the mighty rivers, which debouche at an astonishing distance from their origin, much of the wood which grows along the banks of these gigantic streams, is annually borne down towards their mouths, and either arrested there, forming temporary islands, or carried forward, and ultimately precipitated to the bottom of the ocean. This process goes on to an extent of which few have any adequate idea ; and what is every year so transported by the currents of the Mississippi, the Ganges, and the McKenzie rivers, surpasses the belief of most Europeans. At the outlet of these rivers immense rafts are seen waiting the moment when they shall be hurried onward to the deep, or sunk at once where they now float. At one of the outlets of the Mississippi a raft of this sort was observed ten miles in length, two hundred and twenty yards wide, and eight feet deep. The successive layers of these spread over the lower surface of the ocean

must form beds of great depth ; and to the quantity of woody matter derived from this source, we must add the vast flora of the ocean itself, which extends to its remotest bounds, though varying in size and abundance, being most profuse and gigantic in tropical latitudes. Nowhere is it wanting, even on the shores of the polar ocean sea-weeds grow ; along our own coast they are varied in form and considerable in size ; yet falling far short of the huge productions of the equatorial seas. Many of those on the coast of Britain are thirty feet long, yet those of the Pacific attain a length of from 500 to 1500 feet : and, moreover, they grow with an astonishing rapidity in all, but especially in tropical latitudes. Their numbers are also great ; so that even on the shores of the Orkney islands, they obstruct the passage of boats ; and in the Gulf-stream they are so abundant as to prove a serious impediment to the sailing of ships ; and we read that they opposed such a barrier to the progress of the vessels of Columbus as to cause the ignorant and superstitious sailors to regard them as an obstacle interposed by heaven to the prosecution of what they considered an impious voyage. The periodical detachment of these from their place of growth, or decay of them on the spot of their birth, must furnish annually an incalculable quantity of vegetable detritus, which, added to the former, must furnish a provision of coal of a very ample kind. It may be objected that we have no sufficient reason to infer that all this woody and vegetable structure will ever be changed into coal : but the observations and experiments of modern botanists, geologists, and chemists are quite sufficient to warrant this conclusion. The woody texture of even the most compact mass of coal from the oldest coal-measures can be demonstrated ; the distinct forms often found in the coal seams, point out the particular tribe or genus of plant, which have been so submerged and compressed ; the more recent coal formations retain so much of the woody structure as to be termed wood-coal, or *lignite* ; and the transformation of trees, even of whole forests into peat or bog, which we see take place so extensively, indicates the first step in the process ; for pressure, heat, and time, with an admixture of bitumen, are all that are required to change peat into coal ; as the observations and experiments of Dr. McCulloch amply prove (*Geology*, vol. 2, p. 319). The requisite heat and pressure being provided by the vast body of the ocean, time is effecting the necessary changes on the wood thus preserved at the bottom of the sea, now, as afore-time ; and it only waits the action of the volcanic forces to upheave it, and bring it near the surface, where it will be accessible and useful. These forces are held in check now, till a necessity shall arise for them to spring into action, the result of which will not be less favourable to the interests of the distant and unborn inhabitants of the earth, than those of old were to ours.

Such speculations are any thing but idle, hurtful, or tending to narrow our views of God and *his* providence. For what more convincing proof could we have of the *economy* of nature, than in thus gathering up the fragments of her works, that nothing may be lost, and storing them away for the use of millions, yet un-

born, who will be enriched and benefited by these "treasures of the deep?" And how must it increase our conceptions of the greatness and goodness of that Being, who has created us with faculties, which not only allow us to judge of what occurs in our own time, and under our own immediate observation, but enable us to dart a penetrating glance "through the dark depths of time" past, and thence draw comforting and satisfactory inferences for the events of futurity?

Some have thought that it was the necessary consequence of these investigations to give a sceptical tendency to the mind; but such a consequence is neither natural nor necessary. Have we not the example of some of the greatest men the world has ever seen, and who have given their attention to the most elevated speculations which could engage the powers of the human mind, testifying to the contrary? Did not Keppler and Newton, when they ceased from their lofty studies, which made us acquainted with the beautiful laws of number and harmony, which retain in their places the immense orbs that circle through space; did not they, when they returned, as it were, from "walking on the battlements of heaven, and beholding the glories that were around them," record in language the most devout, their homage and profound sense of the perfections, the wisdom, the benevolence, and power of that Being, whose almighty fiat first called into existence those stupendous masses, and whose nice adjustments of them alone prevents them rushing into collision, which would be attended with such a shock, and disturbance to the whole system, that, compared with it, the most tremendous earthquake which has ever happened to our planet, would be but as the trembling of the most delicate balance before its final quiescence. The works of Newton are well known in this country, those of Keppler less so than they deserve; he who stated his conviction of the triumph of the truth in these words, "The day will soon break when pious simplicity will be ashamed of its blind superstition,—when men will recognise truth in the book of nature, as well as in the Holy Scriptures, and rejoice in the two revelations;" also concluded his labours with the following modest apostrophe: "I give thee thanks, Lord and Creator, that thou hast given me joy through thy creation, for I have been ravished with the works of thy hands. I have revealed unto mankind the glory of thy works as far as my limited spirit could conceive thy infinitude. Should I have brought forward anything that is unworthy of Thee, or have sought my own fame, be graciously pleased to forgive it me."

We hope, then, it will be believed, in anything we may say on geology, or other branches of science, in connection with natural theology, that it is far, very far from our intention to weaken the reliance of our readers on the doctrines of revealed religion, or to raise doubts we could not satisfy—doubts which, if carried into action, could only be productive of misery and misfortune.

REMINISCENCES OF THE RHINE;

ORNITHOLOGICAL AND ENTOMOLOGICAL.

[Continued from page 168.]

RESPECTING insects, I must repeat my inability to give any thing like a detailed account, proportionate to the number coming under my casual or permanent observation. My nippers, as I have already said, were disposed of to a friend on leaving England, and the absence of good collections in my own neighbourhood, or books with plates of insects not indigenous in this country, precluded my noting down with accuracy, the names of many which I either saw or captured. With this explanation, by way of preface, proceed we to enumerate some few of those which can be ascertained, not of every day occurrence in Great Britain.

Swallow-tailed Butterfly (*Papilio machaon*). Though rare in England, being chiefly confined to the fen counties of the eastern coast, it is by no means so on the Continent, and I was rather surprized to meet with but one specimen, namely at St. Goar on the Rhine. Borne on a smart breeze, the beautiful insect had crossed the river and passed me with the rapidity of lightning; but, pursuing its course by the eye, I observed an extensive patch of dark mud, bloating under the rays of a hot sun, which I rightly conceived might prove too strong a temptation for the airy traveller, whose habits are little in accordance with its cleanly and courtly drapery, preferring to revel on the decomposing putrefaction of a moist dunghill, to sucking the nectar of roses, of which it seems so much better qualified by its dress and elegance of demeanour to partake. Though rapid on the wing, when once settled, and in the full enjoyment of its beverage of filth, it may be approached without much difficulty. I was right in my conclusion; on the mass of black mud it had tarried, to sip the essence of a large drain which emptied itself on the shore; it became my prisoner, and is now in my cabinet.

Black-veined White Butterfly (*Pieris crataegi*). Donovan calls this one of the rarest species of the white tribe of butterflies found in Britain, but like many other insects, I believe its scarcity to be periodical, plentiful in one season, and then totally disappearing, for possibly several years to come. Though plain, and with few attractions to the ignorant observer, its transparent wings, and peculiar fashion of flight, are sure to draw the attention of a Naturalist to an insect, which assumes so foreign an address. My specimen was taken at Baden.

Pale-clouded Yellow Butterfly (*Colias hyale*). This is another pretty insect, rarely found with us, but common enough in various parts of the Continent. I have found it in nearly all localities; very abundant in the warm emerald meadows in the vallies of the Pyrenees, and by no means rare in those at Baden, where its gaudy golden plumage is sure to attract notice.

Marble Butterfly (*Hipparchia galathea*). The character which this insect bears for partial localities in this country, is equally true of it on the Continent. For miles and miles I have traversed districts without seeing a specimen, and then fallen in with spots absolutely swarming with them. It would seem from this, that the Marble Butterfly is less inclined to wander beyond the limits of its birth-place than many others of its family; it might be wished that the migrations of the lepidopterous tribes, and indeed of several others, were a little more attended to by Naturalists. For that many wander, and some do actually migrate, or expatriate themselves, is a matter beyond all doubt. I have myself seen instances of almost all our common butterflies, far away on the wide sea, out of sight of land in calm or moderate weather, when there was no reason to suppose that their marine perigrinations were occasioned by off-shore storms. It is difficult to point out the various domiciles of this insect on the banks of the Rhine; but he who explores the many delightful vallies and meadows in the environs of Baden, will assuredly bear testimony to the number, and partiality for particular spots, alluded to in the above remarks.

The Purple Emperor (*Apaturus iris*). Oh! for my absent nippers, was the involuntary exclamation, as, in a hot sunny glade, in one of those romantic pathways cut in the hill sides, looking downwards on the busy bustling crowd of idlers grouped near the Courshauss at Ems, one of these purple paragons of beauty, after gliding with motionless wings, as if supported on a sun-beam, settled on the ground a few paces before me. To gaze in silence in the presence of the royal insect was all that it permitted; for, on advancing, albeit with tread most cautious, his emperorship darted off, with a velocity scarcely allowing the eye to follow his airy flight, until high above a neighbouring oak tree, he again besported himself on motionless wing, gliding or wheeling spirally aloft, in the full enjoyment of his liberty, as if conscious that he was beyond the research of entomological curiosity and contact.

Camberwell Beauty (*Vanessa antiopa*). There is a passage in *Foster's Essays*, which I have never read (and often and often have I referred to it) without a deep conviction of its truth and beauty. "Places and things which have an association with any of the events or feelings of past life will greatly assist the recollection of them. A man of strong associations finds memoirs of himself already written on the places where he has conversed with happiness or misery. If an old man wished to animate, for a moment, the languid and faded ideas which he retains of his youth, he might walk with his crutch across the green where he once played with companions, who are now probably laid to repose in another spot not far off. An aged saint may meet again some of the affecting ideas of his early piety, in the place where he first thought it happy to pray. A walk in a meadow, the sight of a bank of flowers, perhaps even of some one flower, a landscape with the tints of autumn, the descent into a valley, the brow of a mountain, the house where a friend has been met, or has resided, or has died, have often pro-

duced a much more lively recollection of our past feelings, and of the objects and events which caused them, than the most perfect description could have done ; and we have lingered a considerable time for the pensive luxury of thus resuming, if I may so express it, the departed state of our minds. How much there is in a thousand spots of the earth that is invisible and silent to all but the conscious individual."

It was on a summer evening, of early life, when little more than a child, in rambling through a wood on a holiday, my attention was drawn to a spray on which rested a Camberwell Beauty. I had never seen such perfection before. My eye rested on the rich dark velvety wings, fringed with ermine white, relieved by an inner border of metallic blue spots, like bracelets of *lapis lazuli*. At this moment I could mark the very spot in the forest where this vision was revealed, and well do I remember the thrill of delight with which I captured and carried off my prize in triumph, to exhibit before a little knot of schoolfellows. I can see their uplifted hands, I can hear their exclamations of surprise, as they beheld the splendid captive. I can recall their features and their forms as if now living, though every individual among them has long since been called away, and now possibly familiarized with greater things than it is permitted man's philosophy to dream of here. But to me, trifling as this little incident may appear to many, the results through life have neither been unimportant, useless, or uninfluential ; for it is to it I stand indebted for many a happy hour. That "poor insect" awakened a taste which has never slumbered ; and the cultivation of natural history has been my solace in times and seasons, when the mind required something to fall back upon, apart from the business and pursuits of the world. It so happened that from the time I have alluded to until a few summers ago, in one of the mountain passes of the Pyrenees, I had never met with a single living specimen of *Vanessa antiopa*, when, on a lovely day, on a spray the very counterpart of that of the days of my childhood, I saw the expanded wings of this insect, and the days of "auld lang syne," which first introduced it to my notice, came across my mind vivid and clear as though but of yesterday. This summer, again (and not unfrequently) I fell in with this associate of early years. Children, indeed, may they be called of the sun. In the hot and sultry hours of noonday, they would flit by, rendering it almost impossible to watch their course ; if in these flights two or three met in the glade, they paused in their speed, and, fluttering together, so busied themselves in their conflict of rivalry or affection, I know not which, that I more than once caught two at a time, and after admiring them, in gratitude for the benefit I had received at their hands, sent them forth once again to enjoy their summer revelries. At other times (I particularly recollect one occasion), in a wood on the summit of the Drackenfels, when the wind was rather keen, I found numbers resting on the backs of trees, in a state of stupor ; they made no attempts to escape, and when thrown into the air their wings barely opened, or flapping feebly, eased their fall, or enabled them to seek repose on the stem of the nearest tree.

The White Admiral (*Limenitis camilla*). Nearly as abundant, and in situations similar to the preceding, and more easily taken, even in the heat of the day; for, although their flight when on the wing is rapid in the extreme, they seem to be so absorbed, when in contact with the nectaries of the bramble blossom, as to forget all but the immediate luxury of suction. Nothing can be more interesting than to observe the contrast of the upper and under wings, as they slowly shut and open on the flower: a person not conversant with this peculiarity would have a difficulty in persuading himself that the insect with the closed and opened wings was one and the same.

Silver-washed Fritillary (*Argynnis paphia*). With the exception of the splendid Swallow-tailed Machaon, none of the above insects so prominently catch the eye of the passing traveller as this species of the Fritillaria. Its size, its gaudy bright bay or chesnut colour, chequered with black spots and streaks on the upper, contrasted with the metallic lustre of the silvery iridescent tinge of the under, side of its lower wings, cannot fail of striking the attention of the dullest observer. In the heat of the day, on almost every hedge-side few or more may be seen. But, to contemplate them in perfection, let me recommend the Entomologist who passes through Carlsruhe, to tarry awhile and expose himself to the burning rays of a July sun, on the bare, exposed, widely extended, and almost boundless gravel esplanade in front of the Ducal residence. No hint will be necessary to induce him to seek, if not shelter, at least variety, in addition to their grateful though almost overpowering fragrance, within the lengthened lines of orange trees all in richest and healthiest bloom, and there will he have an opportunity of seeing what the Paphia really is when under the influence of sunbeams which seem to awaken every nerve, and muscle, and passion into action, in the full enjoyment of the odoriferous banquet provided by these balmy blossoms. Not by twos or threes, but by almost hundreds, I saw them, now hovering, now reposing on the orange flowers. Bishop Heber, in a beautiful passage on the sum of happiness enjoyed by the lower classes of creation, speaks of the flying fish as leaping from the water, not as is generally supposed, from apprehension of danger, but "apparently in the gladness of their hearts, and in order to enjoy the sunshine and the temporary change of element." "Those writers (he adds) who described the life of these animals as a constant succession of alarms, and rendered miserable by fear, have never seen them in their mirth, or considered those natural feelings of health and hilarity which seems to lead all creatures to exert, in mere lightness of heart, whatever bodily powers the Creator has given them."* I was never more struck with the force of this remark than on the day I witnessed the countless assemblage of the silver Fritillaries on the orange blossoms before the palace of Carlsruhe. There was a quivering sense of delight in every motion. So intoxicated

* Heber's *Journal*, vol. 1, p. xxiii.

were they with the luscious juices pumped up by their deeply inserted proboscis, that they might be approached, and even captured with little address or difficulty ; and it was delightful to see the smart, healthy, and invigorated percussion of their wings against each other, and hear the clacking sound, which like a clapping of hands, might be considered as indicative of the pure and unalloyed pleasure these humble retainers at the bounteous table of nature were privileged to enjoy without measure or reserve.

The Black Hair-streak (*Thecla pruni*). One of our ablest writers, Mr. Curtis, tells us that this insect was almost totally unknown to the Entomologists of Great Britain until lately. When in Yorkshire, a year or two ago, according to his account, and near Ripley, according to Mr. Stephens, it was taken in abundance ; the hedges of the latter locality being enlivened by myriads hovering over flowers and bramble blossom, in one particular spot, while other hedges at no great distance were perfectly free, though the brambles were in plenty. My own evidence will go with these authorities towards the establishment of the fact of the partial locality and occasional profusion of these elegant little butterflies. In England I had never seen one living, and it was not till I arrived at Ems, and was ascending the hill, in a glade of which I saw the purple Emperor above-mentioned, that I met with a single specimen ; the first I saw arrested my steps, and I watched it for a minute or two, with that indescribable satisfaction known only to the Naturalist, be he botanist, ornithologist, or entomologist ; but the pleasure of novelty was soon satiated, by finding that my little friend was but the *avant courier* of a host, billeted over a region of underwood, a few paces in advance. When settled, they close their wings and display to the utmost advantage the bright orange border and caudal appendage to the lower wing, and allow themselves to be captured without much difficulty. In subsequent rambles I not unfrequently found them, but never in such abundance as in this place.

And here I should close my lepidopteral remarks were it not that I would express my regret and inability to describe one other species of *Papilio* which came under my observation in only one particular spot, half-way down the long hill leading into the valley of Ems, on the road from Ehrenbreitstein. Once or twice, like little meteors, an insect had glanced by, more resembling some I had seen as belonging to tropical climates than natives of Europe. At last a pair happened to meet, and while fluttering together, I was fortunate to capture one, which was, much to my mortification, rubbed to pieces before I could secure it in a safe position. I have in vain looked through the plates of Godart's extensive work on *Continental Lepidoptera*, and hitherto have had no opportunity of consulting other works or cabinets, to ascertain the name of certainly the most beautiful as well as rarest of the *Papilio* tribe I met with during my excursion.

Yellow Beetle (*Trichius fasciatus*, Don., p. 140). Rare in this country, though less so on the western than eastern coasts, according to Stephens, who

gives Swansea as the place of the most abundant locality. It is, however, very common on the Continent, and almost always to be found in the heat of the day on umbelliferous plants. It is a remarkably comfortable-looking insect; its head, thorax, and shoulders, well-covered with a thick down of tawny hairs, give it the appearance of a dull Scotch Terrier; for it never evinces any signs of activity, scarcely moving even a limb, apparently quite satisfied to slumber away its life unmolested in its umbelliferous bed of flowers.

Attelabres, or *Clenis apiarius*.—Said to be taken near Manchester, and has been found in Coombe Wood and Dorking; but, like the preceding, though rare in England, it is of frequent occurrence on the Continent. I met with several specimens. Its bright red, contrasted with the metallic blue of the elytra, renders it very conspicuous.

Carabus auratus.—A rare British species, or rather was supposed to be so—recent search having found it to be even common on certain heaths. Its locality on the Continent is in sandy places, where it may be seen occasionally darting off at full speed like a locomotive emerald from beneath its covertine of a bush or tuft of long grass. It is related of this, or its cousin-germain *Calosoma sycophanta*, that one of the most celebrated French Naturalists was indebted to it for his life. During the Peninsular war, as an officer of cavalry, when under fire, he saw one of these splendid beetles running on the ground, immediately jumping off his charger, and when in the very act of securing his prize in the folds of his foraging cap, a round shot struck his horse, and would inevitable have deprived the rider also of life or limb but for this fortunate circumstance.

Musk Beetle (*Cerambyx moschatus*).—Few insects even of the tropical regions can rival this most beautiful beetle when arrayed in its bright, vivid, granulated, green colouring; for, singularly enough, the specimens vary so strangely, not only in tint but size, that, but for distinctive marks, they might be considered almost as belonging to different families. The specimen I captured on the continent, and the only one, was in the dark road, overshadowed by the dusky foliage of those enormous Pines which form the forest surrounding the Alten Schloss, or the Castle of Baden. Had it been of the comparatively dull colour of those I have met with in England it might have escaped unnoticed, but its effulgent green actually glittered on the ground and betrayed its presence.

(To be continued).

ON BOTANICAL TERMS.

THE names of the order, tribe, family, section, and domus, all end uniformly in zoology, namely, in *ores*, *es*, *idæ*, *inæ*, and *ites*; and the advantages of this plan are self-evident. Botany has at length, though tardily, participated in these advantages; and the honour of having introduced these endings belongs to Lindley, who first developed his ideas on the subject in his *Key to Structural Botany*, published in 1835. Plants, like birds, are there divided into five orders, namely, Exogens (*Exogenæ*), Gymnospermens (*Gymnospermenæ*), Endogens (*Endogenæ*), Rhizanthens (*Rhizanthenæ*), and Acrogens (*Acrogenæ*). These are divided into tribes, as Monopetalæ, Apetalæ, &c. These, again, are divided into groups, which terminate in *osæ*; and each of these are divided into families, the names of which are formed by adding *aceæ* to the root of the typical genus. I have, however, thought that *acæ* would be preferable. The inconvenience of the former is not so apparent in the shorter names, as that of the Rose family (*Rosaceæ*), or Pine family (*Pinaceæ*), but in some of the longer names, as that of the Willow-wort family (*Epilobiaceæ*), the Fig-wort family (*Scrofulariaceæ*), *Polypodiaceæ*, *Plantaginaceæ*, &c., we should feel relief from the omission of a vowel. It would be far less convenient to call the Willet family *Silviadæ* than *Silviadæ*, or the Finch family *Fringillidæ* than *Fringilidæ*; and if this is acknowledged in zoology why not, also, in botany? Several persons who are willing to adopt the improved nomenclature complain of its inconvenience; and certainly I do not see why any unnecessary difficulties should be thrown in the way of any one. These remarks may not be without their utility, and therefore I submit them to the botanical readers of *The Naturalist*, which, like every other equally promising Naturalist, has my hearty good wishes.

C. T. W.

FOOD OF THE HEDGE COALHOOD (*PYRRHULA VULGARIS*, Tem.)

WITH me the Bullfinches (your Hedge Coalhood) are very destructive, particularly to the Plum trees, Apples, Medlars, &c. It is the blossom-buds that are chiefly preferred. I have dissected dozens of these birds, and have never found any remains of insects in the crop or stomach. They are here very numerous, being fostered by the extensive plantations I have made; and I am obliged (reluctantly I must say) to make war on them every spring.

P. J. SELBY.

A BOTANICAL TOUR IN HEREFORDSHIRE, MONMOUTHSHIRE, AND SOUTH WALES;

WITH INCIDENTAL NOTICES OF THE SCENERY, ANTIQUITIES, &c.

BY EDWIN LEES, F.L.S. & F.E.S.L.

ANY observations that may tend more completely to elucidate the Botany of Great Britain, and accumulate materials for a correct geographical distribution of its plants, cannot but be regarded with interest by the inquisitive Naturalist, as additional links in the scientific chain. This applies, too, more particularly to the district I have just cursorily examined, which appears most unaccountably to have been greatly neglected by botanical observers, if we except Mr. Dillwyn, who, in the first edition of the *Botanist's Guide through England and Wales*, has recorded the stations of many plants in Glamorganshire. Respecting the vegetation of the other South Welch counties, little seems to be known; for my friend, Mr. Hewett Cottrell Watson, in his recent and excellent *New Botanist's Guide to the Localities of the rarer Plants of Britain*, has left Radnorshire an entire blank; stating that the *Old Botanist's Guide* contained localities for three cryptogamic plants *only* in that county, and that "not any other stations" were known to him. And while he has only given thirteen plants to Monmouthshire, four of which were communicated by myself, he remarks, under Pembrokeshire—"For this and other counties of South Wales, I have to regret the very incomplete lists it is in my power to give. Indeed, there is, probably, no other part of Britain, in which *half-a-dozen counties together are so little known botanically*. It is much to be wished that some botanical tourist would diligently explore them." This, I think, must be allowed to furnish me with a very sufficient text for illustration and remark; and having occasion for a little mental and bodily renovation, I resolved that while I inhaled the sea breezes on the one hand, I would, if possible, scent out some plants on the other.

Now, then, for the detail of operations. I will first, however, mention, that, to prevent trouble and render my researches more accessible, when any plant noticed by me is unrecorded by Mr. Cottrell Watson, as located in that vicinity, I shall prefix an asterisk to it.

I entered Herefordshire by the pass through the sienitic chain of Malvern Hills, at the northern base of the massive serrated Herefordshire Beacon. Having before, in Loudon's *Magazine of Natural History*, vol. iii., in Hastings's *Illustrations of the Natural History of Worcestershire*, and in Mr. Watson's *New Botanist's Guide*, detailed all the plants of the Malvern Hills that I was acquainted with, I here refer to those publications for the Malvern plants, and hasten upon new ground. As a lover of justice to fellow-labourers in the same

field with myself, which I trust I ever shall be, not “damning with faint praise,” or damning with no praise at all, too often practised by envious and unworthy rivalry to the prejudice of science, I cannot here avoid referring to the list of Malvern Plants published by Mr. Addison, of Malvern, and appended to his admirable article on the Medical Topography of Malvern in vol. iv. of *The Transactions of the Provincial Medical and Surgical Association*. As I fear that article will scarcely penetrate beyond professional hands, from the nature of the volume in which it is placed, I shall here subjoin those plants found by Mr. Addison and not noticed by myself. I, of course, exclude the Mosses and Lichens—of which Mr. Addison has produced a copious list—as too numerous to copy, and being excluded from Mr. Watson’s book, as not conducive to the purpose I have in view.

“*Viola hirta*.—In a lane at Colwall [Herefordshire] abundantly, Cowleigh Park, &c.”

“*Campanula latifolia*.—In a coppice below the Chalybeate Spa.” This is, however, very rare in the vicinity of Malvern, a thousand and one excursions there never having exhibited it to me. I had the pleasure to see it in Mr. A.’s herbarium.

“*Bupleurum tenuissimum*.—At Barnard’s Green, on the right of the road below Garford Court.” One of the most remarkable of Mr. Addison’s discoveries. From Mr. Watson’s *Guide* it appears that, excepting near St. Vincent’s Rocks, Bristol, this is the only station for this very rare plant on the western side of Britain.

“*Torilis infesta*.—Corn-fields below Great Malvern.”

“*Luciola Forsteri*.—In a coppice near the Well House.”

“*Saxifraga tridactylites*.—On the walls and the roofs of cottages.” Very common when it once becomes social upon the walls of man, but rare under other circumstances.

“*Reseda lutea*.—By the sides of the road, common.” Mr. Addison’s accuracy is not to be suspected, or I should have imagined some mistake. Mr. Watson has not recorded it as found in Herefordshire or in any part of South Wales. As far as I have noticed it is uncommon.

“*Nepeta cataria*.—Near the turnpike, by the entrance to Eastnor Castle,” Herefordshire.

“*Mentha Pulegium*.—On the common by the road-side at Barnard’s Green.”

“*Geranium phæum*.—By the side of a watery lane beyond the Hales-end, Cradley,” Herefordshire.

“*Vicia angustifolia*.—Near the Well House.”

“*Hypericum dubium*.—Frequent about Malvern.”

“*Epipactis latifolia*.—In Cowleigh Park, and other places.”

“*Euphorbia Characias*.—This occurs in Mr. Addison’s list *without any*

assigned habitat, and is, therefore, I fear, not to be depended upon, having possibly crept in erroneously. Should this not be the case, it would be gratifying to have further particulars respecting it, as there is only one certain locality known in England for this plant, and that is in Needwood Forest, Staffordshire. I have in vain examined the Spurges at Malvern, with the hope of finding it.

"*Scolopendrium Ceterach*.—On a walk, and on the Abbey Church, Great Malvern." This is a very rare fern in Worcestershire, and as it does not grow on the Malvern Hills, it must have been introduced at the Abbey.

Having taken the liberty of making these observations on Mr. Addison's list of plants, and inviting the same animadversion on my own, I now proceed with my enumeration. Immediately on passing the Malvern chain, a broad belt of grau-wacke limestone, forming part of the "silurian system" of Mr. Murchison, fills up the intervening country to Ledbury, where the lime is extensively quarried. I dismounted to examine the country, and the following plants occurred :—

* *Rosa micrantha*.—In various tall, drooping bushes on the grau-wacke by the side of a rill in the valley beyond the station for the *Galanthus nivalis*. The smaller flowers and more delicate habit of this plant distinguish it from the common Sweet Briar, and the fruit is characteristic; yet vigorous young shoots put on a considerable resemblance to *R. rubiginosa*. I met also with a *variety*, forming a low bush with very delicate *smooth* leaves, doubly serrated, but without glands, except minute ones in the serratures. Scent cowslip-like; prickles rather numerous, scattered, strait, or deflexed, and aggregated in threes, fours, or fives, under the stipules. No flowers.

Rosa rubiginosa.—Who is there that is not familiar with the grateful smell of Sweet Briar hedges, and will not hail with joy this favourite of the garden in a wild station? Gathered in the valley north of the Ledbury road, and between Ledbury and Bromsberrow.

* *Rosa Forsteri*.—This species (or variety of *canina*, as considered by some botanists) is only placed as occurring in four counties by Mr. Watson, and one of these is Worcestershire. I now met with it in Herefordshire, and doubt not it will be found of general occurrence. The very hairy midrib of the leaves easily distinguishes it, although the extremely short peduncles offer another character perhaps variable.

* *Rosa systyla*.—This rose seems a comparatively scarce one, and is certainly so in this district, where it has very rarely occurred to me. It seems confined to the south, according to Mr. Watson, who has it only in seven counties, all of them southern, except Worcestershire. It is possible that this species may be passed as a variety of *R. canina*, though the prominent styles offer a distinguishing mark; but the fact is, they do not appear at all conspicuous till the petals and stamens have disappeared, when they appear very remarkable; but the flowers having then vanished, the plant has lost its attractions, except to a scrutinizing eye. I found

it in a hedge on the Bromsberrow-road from Ledbury, just beyond a public house called The Pye's Nest.

Prenanthes muralis and *Sedum telephium* occurred upon the grauwacke rock in the valley below the Beacon, and *Carex axillaris* and *Stellaria uliginosa* in a marshy spot near.

Several battered specimens of the Yew (*Taxus baccata*) presented themselves on the side of the road leading to Ledbury, and some very fine aged ones adorn the Ridgeway, an ancient raised road leading to Earl Somers' mansion of Eastnor Castle. Here, also, I noticed some fine specimens of the Juniper (*Juniperus communis*) growing among a thicket of brambles. **Viburnum lantana* and **Clematis vitalba* appeared growing upon the limestone within a mile of the town of Ledbury.

The vicinity of Ledbury, blocked up with various detached limestone eminences on its eastern side, and overlooking the great extension of the old red sandstone, backed by the solemn Black Mountains, presents rather an attractive focus to the botanist, which is increased by the prevalence of deep woods along the sides and bases of the hills, and the variety of soil, the new red sandstone appearing at the distance of three miles only on the Bromsberrow road. I, therefore, paused here for the remainder of the day. In the churchyard is a very fine, lofty, spreading Wytch Elm (*Ulmus montana*), and avenues of Lime (*Tilia Europæa*) enfilade the paths. The Red Currant (**Ribes rubrum*) was growing as an epiphyte upon them. It is curious that an analagous circumstance is recorded with respect to the great Lime-tree at Neustadt ander Linde, Germany, where Gooseberries grown in the hollows of the tree there are sold to curious visitors.†

On a limestone hill, north of the church, I found the beautiful *Vicia sylvatica* "canopying Titania's bower,"‡ and *Epipactis latifolia* occurred sparingly.

Between Ledbury and Bromsberrow I noticed *Campanula patula*, **C. Trachelium*, and *Hypericum androsæmum*. *Acer campestre* was very abundant in the hedges, one old specimen being seven feet in circumference.

In passing along a narrow lane in my way towards Bromsberrow Church, I came upon an open space at a spot called Brownsend, where stood a most magnificent specimen of the **Tilia parvifolia*, rivalling in growth and spread of bough any Oak or other veteran of the forest. It was not until after close examination that I could be satisfied that it was a lime of this species, though in flower: certainly the finest I ever saw. At a yard from the ground the trunk measured fifteen feet in circumference; heighth full eighty feet. Although the *T. parvifolia* is certainly indigenous in the country about the base of the grauwacke heights, I conceive this identical specimen to have been planted, not only from its central position, but from its vicinity to an old farm house. Some noble old spe-

† Loudon's *Arboretum Britannicum*.

‡ Sir Walter Scott.

cimens of **Tilia grandifolia*, of singular growth and large dimensions—drawings of which I exhibited at a meeting of the Linnean Society—stand in a meadow in the vicinity. Close to the church wall I also noticed a fine growing Oak towering high in air; seventeen feet six inches in girth at a yard from the ground. I was much pleased to perceive that some friend of the Dryads—alas! too often now ruthlessly neglected—inhabited this quarter; for at the fork of the tree, where it divaricated into two vast arms, a piece of lead had been placed and so adjusted as to carry off the moisture from, and prevent its decaying, the trunk of the tree.

From Ledbury to Hereford, and thence to Abergavenny, is a mass of old red sandstone, offering few features of interest either geological or botanical, till Monmouthshire is entered upon. The Wye itself is not very attractive at Hereford; and though the sombre massive cathedral and several singular, grotesque timber buildings in that last English city claim the attention of the antiquary, they do not, at present, further concern me in my vegetable explorations. As far as my observation extended, there appeared no difference in the plants to mark the old red sandstone from the new: perhaps the *Roses* are less abundant and luxuriant, *R. arvensis* rather predominating. It is somewhat curious that **R. villosa* in abundance is a distinguishing character in the Welch flora. In Worcestershire this is a rare species; it is of more frequent occurrence in Herefordshire: for I observed it in considerable plenty along the hedge between the second and third miles from Hereford; but in Wales itself, as in the vicinity of Brecon and in the vale of Neath, its deep pink flowers covering whole thickets in the greatest profusion, offer an enchanting spectacle to the commonest observer.

Between Ledbury and Hereford I observed *Orchis maculata* very plentiful in the meadows, and the fragrant *Gymnadenia Conopsea* sparingly. The latter, though stated by Mr. Watson to occur in all our floras, except that of Devon, is certainly a local plant, though overspreading whole fields where the soil is congenial to it.

At Trelew, between Hereford and Pont Rilas, is an Elm (*Ulmus campestris*) of great height and magnificence. I omitted to take its dimensions, but was informed that it was two hundred and seventy years old. It stands close to an old farm house by the road side, and was probably planted when the house was erected. I heard something relative to this structure having been formerly inhabited by a family of consequence; but a mist has here risen upon my memory, which my memorandum book fails to clear up. The Elm seems to have advanced no farther in this direction; and taking leave of the “elmy granges,” so characteristic of England, I in reality entered South Wales at “Monmouth Cap,” although still in England by act of parliament.*

* Monmouthshire was made an English county, by act of parliament, in the reign of Henry VIII.; Welsh is nevertheless very frequently spoken by the country people.

Crossing the Monnow, which runs by the side of the road for a considerable distance till lost in a dingle of the sullen Black Mountains, a pleasing scene presents itself. On the left the heights rise up thickly covered with wood, while extensive green meadows spread below, through which the shallow river brawls hoarsely over its stony bed, seen at intervals through the dense foliage of oaks that overshadow it, while here and there a funereal plume of yew increases the gloomy solemnity. Beyond, appear the terminating defiles of the mountains, whose dark parallel masses envelop each other in deep shadow as the traveller journeys in apparent review past their huge flanks. Immense quantities of the *Petasites vulgaris* cover the banks and bed of the Monnow with their enormous leaves. I observed, also, by the road side, a large *Salix alba*, which, wreathed to its summit with Ivy, presented a singular aspect, with its silvery leaves in contrast with the dark-green Ivy which, like an insidious serpent, had sprung upon and was overpowering it within its multifarious folds. Although the Ivy seems to have no choice, but will mount up any tree within its influence, the *Salices* seem, in general, less liable to its attacks; and hence, when triumphant, upon a large specimen of the *alba* especially, the picture it presents is rather remarkable.

As I approached Llanvihangel, the singular hill, called the Skirrid Vawr, towered on the left of the road, presenting, in its contour, the remarkable appearance of a couchant beast of prey with an offspring at its feet. The fact is, that this lofty mass of old red sandstone has undergone the phenomenon termed a landslip, at some former period, a huge mass having been precipitated from the summit to the base of the hill, and a steep precipice and yawning gap now intervene between the two masses. To add to the picturesque effect, the young one, if the fallen rock may be so termed, is now luxuriantly overgrown with wood. This circumstance has been seized upon by superstition to impart a "holy" character to the hill, it having been imagined that the rock was "rent" at the crucifixion of our Saviour, and it bears the appellation of "The Holy Mountain" to this day among the people of the neighbourhood. The foundations of a chapel, dedicated to St. Michael, may still be traced upon the hill, which merits a visit from the geologist, though not upon this account. It might be curious to inquire whether, in fact, this landslip of the Skirrid Vawr, to which I have alluded, was not really co-incident with the celebrated journey of Marclay Hill, in Herefordshire, noticed by the old chroniclers, and which is another member of the "old red" strata. This might tend to prove a later shaking of this part of the island than geologists have hitherto admitted.

Llanvihangel House is surrounded with avenues of the Scotch Fir (*Pinus sylvestris*) finer and more magnificent than I have anywhere else seen, of considerable altitude and great spread of bough. I measured one of the largest between the road and the house, which was eleven feet in circumference at a height as high as I could reach to measure, and rising up to the spread of the boughs above fifty feet, nearly of the same magnitude of bole.

At Llanvihangel Pentre I noticed in a field the **Colchicum autumnale* in fruit in great profusion; and on my remarking it to an individual residing near, he informed me that, in the spring of the present year, seven cows were poisoned in that meadow by feeding upon the plant, and that he himself saw them lying dead in the field. He stated that they belonged to a farmer of the name of Watkins, who lived in the parish, and was imprudent enough to turn them into this meadow in the early spring, after a winter's feeding on hay. Greedy, in consequence, after green food, they devoured the *Colchicum*, and were all found dead the next morning! This insidious plant, whose purple flowers in the autumn are its only recommendation, should be destroyed without mercy by the farmer wherever it presents itself. I do not think, however, unless under the circumstances stated, that cattle would, in general, prefer to eat it; and as its leaves and fruit only appear in the spring and early summer, it is innoxious when it adorns, as it does profusely in Worcestershire, the short green aftermath.

As I passed through the valley between the Skirrid Vawr and Sugar Loaf Hills, I noticed the **Sanguisorba officinalis* in considerable abundance, in the meadows on both sides of the road.

On alighting at Abergavenny, though evening was rapidly approaching, I hastened on with the intention of ascending the Sugar Loaf forthwith, but getting almost inextricably involved in the dense mass of wood that covers the buttresses of the mountain, I found it impossible to get farther than the Derry; add to which, as I emerged from a thicket into a water-course, and caught the purple peak of the hill still far distant, it became involved in cloud, and a copious shower soaking the long grass and pouring from the bushes, was an addendum to the excursion not calculated upon or provided for. I therefore leaped one of the stony water-courses, and made my best way to a practicable path. In my passage I encountered some curiously contorted dwarf Beech trees (*Fagus sylvatica*), though planted I have no doubt; for though, according to Mr. Watson's *Geographical Distribution of British Plants*, it would appear that the Beech held rank in all our floras, I have never yet met with it in the midland counties or South Wales in a situation where its claims as a truly indigenous species could be considered indisputable.

The late Mr. Purton, of Alcester, who was justly honoured by Sir J. E. Smith with the appellation of "accurate," has recorded in his *Midland Flora* the occurrence of *Melampyrum sylvaticum* in "the woods at the foot of the Sugar Loaf, in great plenty."* After an attentive examination of the woods "at the foot of the Sugar Loaf," I am, however, fully persuaded that the plant there occurring "in great plenty" is not the real *M. sylvatica*, but a variety of *M. pratense*, with entire floral leaves, the ♂. of Dr. Hooker's *British Flora*, and the *M. montanum* of

* Purton's *Midland Flora*, vol. ii., p. 751.

Dr. Johnston's *Flora of Berwick-upon-Tweed*. This at all events was the only *Melampyrum* that I could find, and it was very plentiful in the woods of the Derry. As the trivial name *pratense* is so very uncharacteristic, and the plant is an invariable attendant upon hilly woods, if Dr. Johnston's plant cannot stand as a new species, the name *montana* substituted for *pratense* would be advantageous, and prevent those errors to which all botanists are liable, especially if the plant be named from a casual inspection only, in combination with the habitat presumed from the name.

As I descended the hill through the woody outlets, the magnificent Bloreng mountain, robed in the deepest purple, gleamed at intervals as I caught it through the watery cloud; and the last tinge of sunset was lost in the rising mists that began to overshadow the romantic valley of the Usk. The Bat and the Eve-jar, issuing from their retreats, passed rapidly among the thick foliage, and I emerged, at last, into a deep hollow-way leading to Abergavenny. **Hypericum dubium*, and **Lepidium Smithii*, in great profusion, occurred in the fields bordering upon the Derry Wood.

[To be continued.]

REMARKS ON THE PRESENT NOMENCLATURE OF BRITISH ORNITHOLOGY,

WITH A VIEW TO ITS REVISION AND CORRECTION.

BY THE REV. F. ORPEN MORRIS.

[Continued from page 160.]

BEFORE proceeding with my observations on the English nomenclature of our British Birds, I must supply the omission of an exception to the second rule I laid down, with regard to specific names, that is, that "the specific name should express, to the fullest possible extent, the peculiar characteristics of the bird." There are many species named after individuals, either after those who have discovered them, or, by those who have done so, in honour of some friend or illustrious observer of nature, and their name evidently cannot express *any* of the characteristics of the species they represent. Now, it is scarcely necessary to stipulate that such names as these should be only exceptions to the general rule, as the greater portion of animated nature has already received a nomenclature in every

class. In the second part of the above rule, I contend that no name *which is not faulty*, should be changed, even for one more comprehensive; and this, the very nature of *nomina adulatoria** would prevent; still I maintain that it is fair and legitimate that such names as these should, on proper occasions, be allowed. I am borne out in this proposition by the opinion of Mr. Westwood, in a clever paper of his, which, singularly enough, appeared in Loudon's *Magazine of Natural History*, contemporaneously with mine upon nearly the same subject. As one reason against changing such names, he mentions "the injustice done thereby to the original describer of the species, whose name is thus supplanted:" and, further, he says with truth, "the custom of forming specific names from the name of the captor or possessor of a new species, although condemned as a fault by a recent anonymous writer, has been sanctioned by every Naturalist since the days of Linneus—it is an honourable testimony of the opinion of fellow labourers." I must confess that I may appear to be not altogether an uninterested advocate of this practice, even "*in prospectu*" (vide, also, Curtis's *British Entomology*, No. 110, p. 441); but, nevertheless, I have always maintained the same opinion, and I have read as yet no arguments likely to induce me to change it; "nor think it not immodesty" that, for the present, I agree on this point with Mr. Westwood, and I am glad to find that it is not the only one connected with the general subject I am investigating in which our views coincide.

But I must proceed, "*unde a quo abi redeo*," and I will commence my observations with candidly stating my opinion that it will be a happy day for nomenclature when English names are totally abolished. It may be all very well for unscientific persons to retain, *pro tempore*, the local names, which are most of them varied in different parts of the country: thus the Missel Thrush, for instance, of one place, is the Stormcock of another: but we hope the rapid progression of knowledge, which has of late years taken place, will continue to be yet more extensively, if not universally, diffused, and render it quite as easy for those who possess even a small stock of erudition, to call a bird, or an insect, or a plant by its scientific and Latin name, as by its vulgar one. Here we need not speculate: we have only to look at what has already taken place. We are speaking now of birds; but let us argue *more philosophorum* "from like to like." Have not the *coleoptera* almost exclusively Latin names, not one in a hundred being degraded by a vulgar, or what might, with more propriety of language than the word is usually connected with, be called a "trivial" name?†

* With regard to the mode of forming these names, the Latinity of the middle ages, as Mr. Westwood observes, must be employed; but this is so evident, that I am surprised at his having thought it necessary to argue this question, or mention it at all.

† As I am chiefly speaking of *British* birds, it would be hardly fair to use the argument which might be derived from considering the countless number of foreign species, which might, perhaps not quite with equal justice, but certainly with some shew of reason, demand

What impediments can arise, for example, in consequence of *Prionus coriarius*, or *Philonthus impressicollis*, or *Emus hirtus*, having no other than Latin names, beside the thousands of other British insects which have no names except those of Latin or Greek composition? Nay, more; how very few are there even of those which have English names that are called by them generally by collectors, throughout the country: take the very first that occurs in Curtis's *Guide to an Arrangement of British Insects*, the lovely genus *Cicindela*: "*ex uno disce omnes.*" The *Cicindelæ* are anglicised Sparklers; but are they ever so called even in common entomological parlance? Why, then, should we find a difficulty or make one with birds which scarcely exists in the case of insects, and almost still less with plants? Is it not quite as easy to speak of the *Oriolus galbula* as of the *Golden Oriole*? to point to a *Hirundo riparia* as to a *Sand Martin*? or to say that we have shot a *Phalaropus* as a *Phalarope*? I have a great respect for antiquity, which my former arguments will sufficiently prove; but in the cause of science all things subordinate to it should give place, and we must make a sacrifice even of our prejudices and associations in her behalf. Why should we create a difficulty with one class or one genus of the same class which does not exist in another? In many, even in by far the greater number, we have no prejudices to contend with, no English names to remove; and, even among birds, the more recently discovered ones have either no English names, or, if they have, the use of them is scarcely ever called into exercise: take for example the *Anthus Ricardi*, which is much more frequently so called, even by those who are not conversant with Latin, than "*Richards' Lark*," and the *Cursorius isabellinus* than the Cream-coloured Swiftfoot. With what are more properly called the indigenous birds, the difficulty in the way is the universal diffusion of their English names, given to them before science had yet assigned Latin names to them; with more modern discoveries this is not the case, and, therefore, the same difficulty does not exist. Then, again, the original birds, if I may use the term, have shorter, more vernacular, and unmeaning names; but when we come to more recently discovered or less generally distributed species, then we find longer, more descriptive, and more modern names. Of the former, take as examples the Robin, the Thristle, Dunnock, Gull, Cormorant, &c., of the latter, the Olivaceous Gallinule, Whitewinged Crossbill, Funereal Owl, and Whitebellied Swift; but this, I am willing to admit, is partially accounted for by the necessity of the discrimination of diverse species, modern discoveries pointing them out, though formerly, perhaps, all comprehended under one common name. But if, for the present, we are to retain English names at all, we ought, in the first place, to alter them as little as possible, "*nomina trivilia nunquam absque summa necessitate mutanda sunt*;"

from us English names for themselves as well as our more favoured native birds, especially when the former are now almost as extensively diffused, in a preserved state, in this country, as the latter in a living state.

because, as I have before observed, they are of little or no use to the scientific Naturalist, and their use to others will be done away with if they are to be changed incessantly, and transposed backwards and forwards, thus rendering confusion only worse confounded, no doubt with the best intentions. Under these circumstances I advocate the retention of such English names as either have no meaning (at all events none which persons in general would detect), for instance, Guillemot, Auk, and Eagle; or if they have a meaning let it be as nearly as possible a literal translation of the Greek or Latin name. In cases where a bird has been properly removed to one genus from another, or to a new genus, the classical name being changed, it is also right that the English name should undergo a transmutation, but the original name should be reserved for the original or most typical genus. Mr. C. T. Wood seems inclined to act upon this principle, and he is quite right in doing so; but as he has also written upon the subject of nomenclature, I will take this opportunity of expressing my opinion of the way in which, in some other matters, he has worked out and developed his own *theses*.

He is very unfortunate in one of his interrogations: "what a much more lively expression of the birds" he asks, "do the following specific names convey?" (than the original ones):*—"Rosecoloured *Amzel*:" may I ask what *expression* this latter word conveys, unless some latent and recondite one, of which, I am sure, most persons, in common with myself, are ignorant: the same observation applies to Honey *Pern*, Furze *Whinling*, *Sibilous Brakehopper*, *Common Longtail*, &c. &c.; to which the "Rose *Muffin* is added;" "*Afedula Sonans*," of Mr. Wood in one place, "*Afedula Rosea*," in another. "This," he tells us, "is the Long-tailed Tit of authors;" and really, the information is not thrown away, for I am not ashamed to confess that without it, I should have been utterly at a loss even to guess what bird was intended. Allow me also to inquire of Mr. C. T. Wood, the meaning and derivation of the word *Afedula*. Is *Aphedula* intended, from *Aphides* perhaps being preyed on by the bird? I am inclined to *conjecture* this to be the case, from Mr. Wood's saying elsewhere, that *Phasianus* ought to be spelled *Fasianus*, and *Sylvia*, *Silvia*. I hope, however, he will not be offended at my telling him very plainly that here he is quite in error—at least, if *he* is right, Eton and Oxford are far wide of the mark, for they teach a very different orthography, and so also does Pliny, the illustrious patriarch of natural history, who may be supposed to be an authority for the orthography of his own language; being one of the most elegant writers in it whose works have come down to us, and with which I may profess some little acquaintance, having taken up a portion of them for examination at Oxford, for the first time in that university. The above instances which I have given of Mr. C. Wood's alterations in nomenclature, are some of them gratuitous; but even with regard to those which

* I write from memory, and am, therefore, liable to some trifling inaccuracy.

are not, does he seriously imagine or expect that they will ever come into general circulation, or that their cacophony will be endured? I do assure him that they never will.

One word on the name troglodytes, which Mr. Wood says should be written troglodites, but which error I must also prevent from being perpetuated. The word originally was the name of a people, and given to them from their custom of inhabiting subterranean dwellings, *τρογλῆν* a den, and *δύνω* to enter. Mr. C. T. Wood says that the name is engaged for a genus of *Mammals*. He commits the same error in the word *Nicticorax*, &c. &c. as every classical scholar must admit.

I cordially agree with Mr. Wood, that it is to be regretted that unnecessary changes have been made in scientific works by Naturalists of high repute, as, in addition to the confusion produced, an example is thereby set which may be, and is, prejudicial to the interests of science; and it is on this very account that I must, in conclusion, take some notice of the favourable opinion he gives in the last number of *The Naturalist*, of Mr. Neville Wood's book, which, he says, has two or three errors, such as *Phanicura* for *Ruticilla*, and *Brakehopper* for *Locustel*. To the first of these appellations, I suppose Mr. C. Wood objects as being of Greek derivation, for in Loudon's *Magazine*, *loco citato*, he says, that he objects to Greek* words being employed at all in ornithological nomenclature; but as he gives no reason for this objection, we have yet to learn their ground of offence. As, however, I have avowed myself an advocate for their use, I shall feel thankful for any arguments adduced on the other side; and if I deem them sufficient, I will lose no time in giving my assent. Having nothing at heart in these remarks but the advantage and interest of ornithology as a branch of science, I trust that Mr. C. T. Wood will receive my strictures in the spirit in which they are given; remembering his own quotation from Mr. Blyth as to the good that will result from dispassionate discussion of the principles of nomenclature.†

I must reserve the synoptical list of British birds, which I propose giving, for a future number; and in the mean time will conclude this paper by stating that the idea of the conclave of Naturalists, to decide on the retention or discarding of names, is not my own, but was suggested some time ago by my friend, Mr. H. E. Strickland—a fact I omitted to mention in my last communication.

* "I abjure the practice of mixing Greek words and Latin together, *canusini more bilinguis*, in the compounded names of genera or species: it is equally useless and absurd."

† Mr. C. T. Wood, in speaking of *nomina adulatoria*, says that Mr. Lansdown Guilding's opinion entirely accords with his own, and quotes Mr. Guilding, where he says that such names should never be applied to *genera*. But Mr. Wood is speaking of *specific* names, and seems to suppose that Mr. Guilding's words bear him out in what he says about *them*. Here there appears to be some mistake; certainly, however, I agree with both, that the names in question should not be applied to *genera*. I think the instances of their being so used, are comparatively rare.

[To be concluded in our next.]

REMARKABLE INSTANCES OF NIDIFICATION.

THE instance recorded by me, in a former number, of the eccentric nidification of a Wren (*Anorthura*) having elicited a singular parallel from another Correspondent (see page 181), I shall give a few more occurrences of a similar nature and equally interesting. I may here state, in reply to that Correspondent, that the nest of the Chimney Swallow (*Hirundo garrula*, Blyth), appropriated too unceremoniously by the noisy little Wren, was built in an outhouse, and it was so constructed that the feathered tenants could only just enter by the space left between the upper part of the front wall of the nest and the ceiling of the shed.

In the hall of my former residence, Chimney Swallows attempted to build in the upper corners of the walls, for several years successively, making use of the ceiling instead of laboriously constructing the costly dome of the Rose Muffin (*Mecistura rosea*).* So unweariedly did these nature-taught architects ply their hod and mortar that they contrived to advance far in their "temples not made with hands" before much attention had been attracted by their journeys backwards and forwards. The vigilant eyes of the house-maids—a class of persons, by the bye, who are most of them *destructives*—were speedily directed towards the procreant cradles of my little favourites, and they were destroyed. Nothing daunted, the Swallows renewed their attempts at establishing their in-door colony, working like so many masons; but it was all labour in vain. I would willingly have marked the lintels of the entrances, that the destroyer might pass by; but the unlucky Swallows were apt to get into a sky-light, which proved as fatal to them as was Doubting Castle of Giant Despair, in the *Pilgrim's Progress*, to the unfortunate mortals who entered in thereat. I, therefore, had the door closed till the mania was over.

I have noticed several other rather strange choices of places for building manifested by birds; and as the feathered bipeds have no *Architectural Magazine*, their choice of a site may be determined by caprice rather than by fixed principles. I refer the reader to page 513 of the *Field Naturalist's Magazine* for a very remarkable instance of attachment to its nest manifested by a Garden Willet (*Sylvia melodia*, Blyth). I have known a similar instance of attachment to home in the Noisy Willet (*Sylvia loquax*, Herbert); and though the nest in this instance was certainly not "made a complete ruin by a flock of Ducks," yet it was sufficiently damaged to afford abundant apology for desertion. I have witnessed the nests of the Common Redstart (*Ruticilla luscinia*), the Robin Redbreast (*Rubecula familiaris*), and several other common birds, in extraordinary situations, which, at some future time, I may probably describe.

C. T. WOOD.

* Longtailed Tit and *Parus caudatus* of old authors: Leach has very properly constituted a new genus for the reception of this species and its congeners. The *Muscicapa luctuosa* of old authors I propose to call the Pied Collet (*Aphedula luctuosa*).

NOTES OF A BOTANIST.

(Continued from page 124).

PECULIARITIES OF FORM IN THE STRUCTURE OF THE BLOSSOM.

AMIDST the endless diversity discoverable in the forms of the blossom, we find some unusual singularities, and these striking deviations, we may rest assured, have their peculiar design in the beneficent arrangements of a prospective Providence. The Fly, Bee, Wasp, and Butterfly Orchises—the flowers of the *Oncidium papilio*, and those of the *Peristeria elata*, not to name myriads more of remarkable epiphytes, adorned with blossoms as exquisitely beautiful as they are singularly curious—all have a specific purpose to fulfil in the economy of creation. Not the least remarkable among blossoms are the flowers of the *Aristolochia*: those of the *A. trifida* have a prolonged lip, which, from its slender form, might be truly called “a hair lip.” A proper inspection of the distribution of the blossoms will unveil the design of this curious conduit. The flower is a true condenser of the aqueous vapour that settles on it; and, on the principles of radiation, the structure and the colour will facilitate the deposition of dew, while the elongated lip as duly transmits the stream to the roots of the plant. Many plants, at the period of inflorescence, require an unusual supply of water; such as the *Heydichium flavum*, and others.

The *Kaufussia amelloides* presents a singular feature in its individual petals: they are rolled up, or curled like a lady's tresses, and *temperature* seems to be intimately connected with the phenomenon; nor is it unlikely that moisture has something to do with it, *cold* being the result of its evaporation. I found that the flower of the *K. amelloides*, when pressed in contact with a heated metallic plate, instantly unrolled its petals, which were as suddenly coiled up again on transferring the disc of the flower to the surface of cold water. On the other hand, the flowers of the *Mesembryanthemum*, on their approach to the source of heat, inflected their petals inwards towards the centre.

MATURATION OF SEEDS.

In a former section, it will be remembered, I adverted to the natural *ventilation* of seeds, and incidentally mentioned some interesting provisions made for this purpose. To secure their *maturation*, we find *insulation* and *uniformity of temperature* not unfrequently essential conditions, and these are accordingly stipulated for in the physiology of plants. A continental writer has, in a recent number of the *Magazine of Natural History*, favoured us with some crude and

undigested experiments made on the *Arachis hypogæa*, or "ground nut;" and his conclusions are, as might be expected, meagre and unsatisfactory: namely, that darkness *may* be necessary to perfect the maturity of the pod, and that it *may* further absorb "something" from the earth, and this "something" *may* be water. To those who have attended to the phenomena of this extraordinary plant, the *true cause* is evidently to secure the *uniformity of temperature* maintained by *terrestrial warmth*. The temperature of the *earth* and the *air* are very different: that of the former will remain comparatively uniform during the night, whereas the latter will be subject to incessant vicissitudes. It is thus that, in a medium of uniform temperature, immature seeds may be ripened; and in this manner have I matured the green fruit of the *Bannana*: a thousand proofs might be adduced in verification. The *Colchicum autumnale* ripens its seed-vessel and contents below the surface of the ground, and if circumstances do not permit the *cyclamen* to bury its seeds for the same purpose, it is interesting to observe how carefully it coils the stalk round the vessel, so as effectually to conceal it; not merely to shroud it in darkness, but to preserve externally the uniformity of temperature maintained by the plant.

On the same principle are similar phenomena developed in aquatic vegetation. The *Ranunculus aquatica* matures its seeds below the surface, the *Valisneria spiralis* retracts its seed-vessels to the bottom of the river, and the *Nelumbium*, *Nymphaea*, and *Nuphar* withdraw their seed-vessels from the surface, to escape from the effects of radiation, and take advantage of a medium comparatively unchangeable and free from those alterations to which the ærial medium is constantly subject. Sometimes bags or bladders of air fulfil the purpose of insulation, as in the seed-vessels of the *Passiflora cerulea* and *Colutea frutescens*; at other times, *silk* and *cotton* are the means employed; examples are supplied in the *Asclepias Syriaca*, *Gossypium herbaceum*, and "Silk-cotton Tree." We have an evident proof that this is the intention, or at least the inference amounts to probability, in the fact that we meet with the same provision in denizens of the desert, between the tropics, as in arctic and antarctic lands; thus, the seeds of the *Stapelia* are enveloped in a silky down, as well as those of the Lilliputian Willows, on the shores of West Greenland.

THE ECONOMY OF BULBS.

Under this section it is not my intention to enter upon a description of the various structures presented by bulbs, or the different offices or functions they are destined to fulfil. My task, at present, will be confined to the provisions in their economy to meet extraordinary contingencies. The distillatory function of the *Calla Æthiopica* and *Agapanthus umbellatus* will be remembered; but the *change of place* or position is not less remarkable. While plants generally

remain fixed to the spot, and their roots radiate in every direction, and extend far and wide, as purveyors in search of food, there are others that are truly *locomotive*; the Orchis and Monkshood move laterally from their original position—a phenomenon still more remarkable in the *Arum dracuncululus*. In these the motion is *superficial*; but some Cape bulbs display a feature equally curious. Some of the *Ixias* form their future bulbs *below* the original or parent bulbs, so that they *sink deeper* into the sand; a most wise and beautiful provision, when it is considered that they are constantly subject to denudation from the moving sands and the blasts of the desert. This is the case, too, with the *Antholyzas*, and even the *Anomatheca cruenta*.

(To be continued).

INSTANCES OF CURIOUS VARIETIES OF BIRDS.

ONE of the most remarkable varieties of plumage in the feathered race that ever fell under my observation, was a Cuckoo entirely white. I regret that I know nothing of its history, or even where it was shot; but it is still in the possession of Mr. Reid, Animal Preserver, of Doncaster, where I saw it. I have known two or three instances of white Jays, one of a white Jackdaw Crow, one of an entirely white Hedge Coalhood (or Hedge Alp, as it might be named), and several of partially white Garden Ouzels, (*Merula vulgaris*). The distribution of the black and white is generally pretty much the same in the varieties of the last-mentioned species. In my collection is a variety of the Garden Ouzel, a female, which was about to lay when it was shot. "I have a female Whin Linnet (*Linaria cannabina*)," writes Mr. Blyth, "which I purchased last year, having a very little white; it has moulted this season, and has now become at least one-third white, its bill and feet also losing their colour. Next autumn I expect it will turn entirely white." A Rook was recently shot by the keeper to John Silvester, Esq., of the Grove, near Ashbourn, the head, feet, and bill of which are nearly white, and the primary feathers of the wing are perfectly white."

N. W.

Campsall Hall,

Nov. 2, 1836.

R E V I E W S .

The Natural History and Classification of Birds. By William Swainson, A.C.G., F.R.S.L.S. Vol. I., being vol. LXXXIII. of Lardner's *Cabinet Cyclopædia*. pp. 365. London : Longman & Co.

THE savage who first placed upon his head a flaming feather from the plumage of the Toucan, as little considered the importance of an investigation into the structure and habits of birds as he who, in the present day, runs over the pages of the richly illustrated works arrayed in all the splendours of art the zoological draughtsman can bestow, and fondly fancies himself an ornithologist. It is not now the pastime of turning over plates or drawings that will constitute any one an ornithologist ; it must not be concealed that deep and attentive study is required to fully comprehend all the details of the science, and that there are difficulties in scientific arrangement and classification sufficient to blunt the edge of the ardour of the most enthusiastic. Mr. Swainson not unadvisedly, then, intimates that no "Introduction to Modern Ornithology," calculated for the present state of science, yet exists, and proposes to supply the deficiency in the present work, which he has arranged in three departments : Part I.—On the structure and natural history of birds in general : Part II.—On the bibliography, nomenclature, and preservation of birds : Part III.—On the natural history and relations of the different orders, tribes, and families of birds.

On these topics Mr. Swainson dilates with the practised hand of a master ; he has been an observer in the cabinet and the field, and it would be injustice not to admit that, with much information on the external anatomy of birds, the volume combines some very agreeable writing. In short, it is what we always must approve—scientific information imparted in a pleasing manner. For the present, we must defer our examination of Mr. Swainson's classification till the appearance of the second volume, particularly as it proceeds no farther than the insessorial order ; and as he states it to be "the result of the last six years' study," it will be most advantageous to discuss its merits when placed before us entire and complete. We shall now, therefore, assume to ourselves the privilege of a "raptorial" bird, and shall pounce down without ceremony upon whatever appears to deserve our notice, and meets our exploring eye within Mr. Swainson's preserve. We feel obliged, however, to take exception to the somewhat lordly manner with which Mr. Swainson delivers his *dicta ex cathedra*, and his almost total neglect of his contemporaries, unless they have been concerned in the manufacture of splendid quartos or folios, or it is their goodfortune "in courts to shine." Thus,

while the most unqualified praise is bestowed upon the Prince of Musignano, for his additions to Wilson's *Birds*, which are "exceedingly scarce volumes," and were never "offered for sale;" poor Bewick, whose admirable figures of British Birds gave an impetus to the study of native ornithology never before effected by the most splendid *Planches Enluminées*—is cursorily passed by as not to be "forgotten," and Mudie's volumes are unmentioned. There is also an unfairness in obviously alluding to a person without mentioning his name, a littleness that every candid mind must disclaim. Why, then, is Audubon's controversy with Waterton, about the sense of smell in the Vulture noticed, but Waterton's name avoided? "Amateurs," it is stated at p. 211, have often visited Demerara, "whose sole object seems to have been that of procuring perfect skins: as to the habits of the birds themselves, their structure, or their classic names, we know almost as little about them as if they never existed." This passage obviously alludes to Mr. Waterton's well known *Wanderings*, where it has always struck us that the neglect of scientific names was to be deplored. But at the same time, is no idea of the glorious productions of that splendid region obtained from the *Wanderings*? We surely see the Couthingas and the Humming-birds, if we cannot classify them, and the measured note of the Bell-bird rings even now upon our ears from the depths of the humid forests. At all events, to condemn an author by implication, and yet ingeniously avoid naming either him or his work, appears to us an act of injustice, which, whether proceeding from friend or foe, we will ever honestly expose. As to the Prince of Musignano, we cannot consider that author the greatest benefactor of mankind who publishes works, however admirable, which are unattainable except to a favoured few, who shew them as they would shew a wild animal they were afraid to lose, within the inclosure of a brazen lattice.

But let us touch upon more pleasing matters with respect to "the butterflies of vertebrated animals," as Mr. Swainson somewhat strangely denominates birds. Following up this idea, we presume it is suggested that birds with concealed crests, that can be shut or expanded at pleasure, use them as decoys for their insectivorous prey. As this is a new idea, and deserves investigation, we present Mr. Swainson's observations on the subject in his own words, and it will give an idea of his powers of reasoning:—

"These crests are generally either of a bright yellow, red, or golden colour; sometimes, though very rarely, white. If the feathers of the crown, which are not conspicuously elongated, are laid perfectly smooth, the crest does not appear, although its presence is sometimes indicated by a slight streak of the same colour. When the bird, however, is excited, the central feathers of the crown suddenly expand, radiate almost in a circle, and display what is often a most beautiful and striking ornament. The bright colours of the crest, in fact, are only at the roots of the feather, which are all tipped with the ordinary colour of the plumage; so that when these are expanded they are no inapt representation of the *opening petals of*

a *Marigold*, or some beautiful little *syngenesious* flower ; the predominant colour of that class, no less than of the crests that represent them, being different shades of yellow. Now, it is a circumstance no less singular than remarkable, in conjunction with what we shall presently state, that of between fifty and sixty birds possessing this sort of crest, every one is purely insectivorous, that is, living entirely upon insects, which are caught, not by hunting, but are seized only on their near approach. We have frequently had occasion to advert to the fact that all the tyrant flycatchers of Brazil never pursue their prey, or go out in search of it, by wandering about from tree to tree, like other birds. They take their station on a particular branch, and there patiently wait, like a Spider on its web, for such insects as come within range of a sudden dart. It is to this family of birds that the crests we have been describing are almost entirely restricted. We have frequently seen the *Bentevi* of Brazil, the most familiar as well as common species in that country, open and shut his fine yellow crest when merely occupied in watching for insects. This fact, joined with the considerations already mentioned, has more than once suggested to us the idea that these flower-like ornaments are occasionally used as snares to attract the attention of insects, so as to bring them within reach of being captured by a sudden dart."

This is curious and interesting, but Mr. Swainson omits to state what might, perhaps, throw a greater light on the subject—the trees principally frequented by these flycatchers, and the colour of *their* flowers. We should know this before we positively decide that the insects mistake the gold-coloured crests for flowers, particularly as *syngenesious* flowers, to which the crests are compared, do not grow upon trees, nor do trees produce them. We had marked various interesting passages for quotation on the sight, tongue, feet, and voice of birds, strikingly illustrative of the harmony perceptible in every department of nature, and the association of one tribe of beings with another ; but as we may have another opportunity to dilate on these subjects we proceed to notice the second division of Mr. Swainson's work, because suggestions arise there that we may not have a legitimate opportunity of remarking upon again. We would just mention, *en passant*, the observation that "the powers of voice are certainly greater in birds, when their size is considered, than in any other class of animals, or even in *man*. This fact is established by experience and by comparative anatomy : we know that the crowing of a Cock may be heard at a far greater distance than the shout of a man, even had he the lungs of a Stentor ; and it may be even questioned whether the same remark may not be applicable to the full and sonorous warbling of the Thrush."

Mr. Swainson's remarks on the progress of ornithological science are very judicious, and deserve the particular attention of the student. His observations on ornithological bibliography are also deserving of notice, though here, we conceive, he has fallen into an error. On the very point where information would have been desirable he fails to give it, merely remarking that, "in regard to European

ornithology, *it is needless* to enumerate the very many works that have been published, in one shape or other, on the birds of the different kingdoms." It is true that he presents us with a long "list of the chief geographic ornithological works, arranged under the five zoological provinces," and intimates his wish to enumerate "such works only as are *absolutely essential* to an ornithological student, or are eminently beautiful in their execution." The "ornithological student," however, that Mr. Swainson has in his eye, must be some "Prince Maximilian" or the "Prince of Musignano;" since none but princes are likely to obtain one quarter of the expensive works he has enumerated. We have no objection to know that, by an outlay of about three hundred and fifty pounds, we may possess some of the most splendid works on "illustrative ornithology;" but this golden Tantalian cup may glance in the eyes of the poor student, but must glitter in vain. We think, therefore, that Mr. Swainson should have condescended to recommend a few standard works which any one could readily purchase for five or ten pounds. As he has not done so, we at once say that the beginner may be very well satisfied with Bewick's *British Birds*, Mudie's *Birds*, Bechstein's *Cage Birds*, Neville Wood's *British Song Birds*, and Selby's *Illustrations of British Ornithology*, if his pocket will allow, for the price of the latter is fourteen pounds: as the letter-press of Selby may, however, be had separately for a guinea, the plates may be dispensed with *pro tempore*. The first edition of Montagu's *Ornithological Dictionary* obtained if practicable, and certainly Mr. Swainson's publications in the *Cabinet Cyclopædia*. Of course, *The Naturalist* will be examined each month, as it is indispensable for the student to possess a periodical on his favourite pursuit. Now this really is to the purpose; and Temminck and Gould may follow when *gold* sufficient can be found; but the *Planches Enluminées* (forty-eight pounds), Le Vaillant's *Birds of Paradise*, &c. (thirty-two pounds), and others, recommended by Mr. Swainson, seem to us out of the question, except for splendid libraries.

Mr. Swainson has entered at some length upon the "laws of nomenclature," with regard to birds. This subject, however, claims, and must have, distinct notice, which would be out of place here. Just, though severe, reproaches are thrown out against the "wholesale coinage of complimentary names which now begin to crowd every page of our catalogues, almost to the exclusion of those by which the species can, in some degree, be made known. Surely there are other ways of expressing our thanks or gratitude to those who assist our labours, than by this very cheap mode of cancelling the obligation. This prostitution of what was once a scientific honour, but which is now within the reach of almost every one, however ignorant of science, or merely following it as a trade." We have always thought that the *crowd* of names now proposed as carelessly as a "how-d'ye-do?" must eventually be obliterated—common sense demands it; for if "John Jones" is sent up into the air as a Kite under the name of *Jonesii*, what is to distinguish

some other "John Jones," who is fortunate enough to find another bird, and anxiously emulates the flight of his namesake? In fact, at the present moment, names occur in scientific nomenclature, which it is a disputed point whom they were intended to commemorate—like tombs from which the original occupiers have been expelled, to accommodate another race that in its turn has passed into obscurity and oblivion. The philosopher will be careless about transient distinctions, which will vainly attempt to confer eminence where it does not already exist. Mr. Swainson is less happy in his objections to the reform in our ornithological vernacular nomenclature, which has been so vehemently insisted upon by several able writers in *The Analyst*. We shall not here touch upon a contest into which we have hitherto refrained to enter; but we think when Mr. Swainson says that "the question has been discussed in some *recent periodicals*," surely with the word *Analyst* in his mouth, he might have suffered it to drop from his pen. This petty *extinguishing* system we shall always notice and reprobate, especially as Mr. Swainson takes abundant care to quote himself, *not without acknowledgement*.

We think the observations of Mr. Swainson at p. 274, on the fitting up of Museums, particularly well timed, and recommend them to the notice of the officers of all the newly established Natural History Societies. This is an epoch in the scientific history of our country, and much depends upon the manner in which the arrangements will be made in the new Museums. The collections now making will be permanent or perishable, according to the plans now entered upon. At Shrewsbury, Worcester, Warwick, Nottingham, and other places, Museums of Natural History are forming, and their arrangement ought only to be entrusted to zealous, experienced, and competent persons. If opinionated conceit be suffered to prevail over zealous activity, hard-earned knowledge, and careful experience—if effect be preferred to taste, and utility sacrificed to variety, splendour and show may indeed triumph over science, but the tide-time having been irretrievably lost, posterity will have to re-commence a labour that might have been saved, amidst faded splendour, destroyed specimens, and broken relics. Looking at the past, and casting a wakeful eye into the future, we give this friendly warning to all, and refer them to Mr. Swainson's useful details for further information.

The Naturalist's Library.—Ornithology. Conducted by Sir William Jardine, Bart., F.R.S.E., F.L.S., &c. Six vols. foolscap 8vo., illustrated with numerous coloured plates and wood-cuts. Edinburgh: W. H. Lizars. 1833—6.

THIS is unquestionably the golden age of Natural History, and perhaps of ornithology more than of any other branch of it. We do not lose sight of the just and daily increasing claims of geology; but, important and fascinating as that study is, eminent as are its indefatigable professors, and surprizing as are the productions of their unwearied exertions, we cannot feel positively assured of being

on safe ground; and the mist and obscurity is still so palpable that the assurances of the very best guides fail to convince us that the ground is not shaking around us, or that the hypothetical causeway we are trusting to may not in reality at last deposit us in some unfathomable gulf, instead of safely landing us on the "old" or "new red," as the case may be. Ornithology, on the other hand, has passed through its incubationary processes in safety; we feel no doubt as to the science that stands arrayed before us in full plumage—we see the museum display to our charmed eyes the assiduous labours of collectors from every region of the globe—the feathered choristers of the groves are themselves in our view in the green wood—and volume after volume wings its flight, decorated by the pencil of the best artists, and illustrated by the commentaries of scientific research, to convey their histories and their economy before the whole world.

But when we call this the golden age of ornithology we are not only referring to the magnificent productions of an Audubon or a Gould. *Planches Enlumonnées* and *Birds of Paradise* have long ago graced the libraries of the prince and the noble; and it may be seen, on reference to the pages of Mr. Swainson in the *Cabinet Cyclopædia*, how easily three hundred and fifty pounds might be laid out in illustrated works on ornithology recommended by that gentleman. But these are luxuries not to be thought of by the student, and perhaps regarded only with wishful eyes by many a practical naturalist. It remained for the present age to produce a series of illustrations alike correct in a scientific view, interesting as works of art, and, from their moderate price, within the reach of every member of the social community. This is exemplified in the beautiful work now before us.

We shall now proceed to an examination of the *Naturalist's Library* seriatim. The two first volumes embrace the *Trochilidæ*, or Humming Birds, with memoirs of Linneus and Pennant. The preceding account of the distribution and economy of this richly decorated tribe is extremely interesting. The delineations of the birds are, in general, very good, though the colouring seems to us, in many instances, dull, and inadequate to express the jewelled splendour of the originals. But we have in our eye the Humming Birds of Bullock as they once glittered in their effulgence before us, and more recently that magnificent case of Leadbetter's, on which the sun seldom shines, but the effect of which, when traversed by a beam of light, can rarely be paralleled. The third volume contains the Gallinaceous Birds, with a memoir of Aristotle. Here the artist is evidently more at home; the colouring is improved, and the figures are seen to greater advantage before a freely-etched, picturesque, but uncoloured, background. *Gallus Sonneratii* (female), *Phasianus torquatus*, *Phasianus veneratus*, and *Tragopan Hastingsii*, are particularly good. The fourth volume contains the Game Birds, with a memoir of Sir Thomas Stamford Raffles. A few of the plates seem rather coarse, but, on the other hand, the British Grouse are admirably delineated from the pencil of Selby himself. The fifth volume embraces the Pigeons, with a memoir

of Pliny. Here, somewhat unaccountably, the Turtle Dove is omitted. The sixth volume, the last as yet published, contains the natural history of the *Psittacidae*, or Parrots, and is undoubtedly altogether the best of the series, the figures being drawn by Lear, well known by his abilities as a zoological draughtsman, and the descriptions by P. J. Selby, Esq.

The very sight of the Parrots, favourites of the cage in Europe, from their first introduction by the followers of Alexander, recall a hundred "pretty Polls" to our recollection, while the grating shrieks from the Parrot-room of the Zoological Gardens, still resounding in our ears, remind us that till they have borrowed a little of the vernacular idiom of mankind, though their plumage might vie with angels, that their voice, like that of the Peacock, can only be compared to a fiend's. As the power of imitating the intonations of the human voice, and even repeating long sentences so singularly developed by this family, is possessed by only a few other birds of the *Sturnidae* and *Corvidae conirostres*, we should have been pleased to have seen this curious subject more dilated upon, especially with regard to the construction of the tongue, and the wild habits of the birds. It is, however, merely cursorily alluded to. "The power of imitating the human voice, and learning to articulate a variety of words and sentences, is not possessed by all the species, but is principally confined to the short and even-tailed Parrots, in which the tongue is large, broad, and fleshy at the tip." The subject is indeed again slightly brought forward in the *History of the Ash-coloured Parrot*, (*Psittacus erythacus*, Lin.) of which Mr. Lear has given a resemblance so faithful and accurate, that we can almost swear to the sly old rascal. As this bird is so well known, the following extract may be interesting :—"Many of our readers will recognise an old and amusing acquaintance in the characteristic figure of this well-known species ; not, indeed, conspicuous for that variety and brilliancy of plumage which distinguishes the great majority of this tribe, but remarkable for its docility and mimicry, the faculty it possesses of imitating the human voice, as well as any other sound, its never ceasing garrulity, and its clear and distinct articulation. In most of these particulars it surpasses the rest of its congeners ; on which account it has always been held in high estimation by the bird-fancier and lover of living curiosities. This we learn from the large sums that have at all times been offered and given for highly-gifted or well-taught individuals. Even as early as A. D. 1500, we read of a Parrot at Rome, supposed to be of this species, for which 100 gold pieces were given by a Cardinal. Its merits, however, appear to have been of a kind well calculated at that period to create an unusual degree of astonishment, and a feeling of the marvellous, as it had learned to repeat with clearness, and without hesitation, the whole of the Apostles' creed. Willughby, also, in his old and excellent work on Ornithology, mentions the high prices brought by Parrots of various species in Holland; and other parts of the continent. To enumerate the various anecdotes related of this bird, would not only occupy more space than the nature of our

work will allow, but would, in a great measure, be only repeating what has already so frequently been told in the works and compilations of other writers. We shall only observe, that in many of the marvellous stories recorded of Parrots, particularly all such as relate to answers seemingly appropriate and consequent to questions put to them, and which some authors would almost seem to imply were dictated by intelligence, or that the birds really understood the import of what was asked, are merely the result, under accidental and fortunate circumstances, of what had previously been taught them by frequent repetition, to articulate by rote."—pp. 106—7.

To the latter part of this dictum we cannot altogether subscribe, feeling confident that in various instances, Parrots have "intelligence" enough to understand, if not the exact meaning of the words they utter, the *subject* to which they refer. We know an old lady, whose feet were so excessively tender, as almost to preclude her from walking, and hence she always went abroad in her Bath chair. She had a favourite Parrot, who when the tea equipage was placed upon the table, was invariably taken out of his cage by the footman, and placed on the board, as a proper accompaniment to the antiquated china. Poll, no doubt an attentive observer, had long perceived there was "something rotten in the state of Denmark," and hence, whenever his mistress failed to dole out what he considered his fair ration, he would, in a threatening manner, exclaim—"Peck your toes, Madam." As he sometimes flew down from his position to put this threat into execution, the old lady, to avoid the assault upon her toes, indulged him with a further allowance, which, of course, only led to increased insolence on his part, and the threat of "*Peck your toes, Madam,*" was still oftener reiterated. At length, one day Poll having cried "Wolf," as he thought, without that attention being paid to the subject which it demanded, proceeded to suit the action to the word with such effect, that the old lady was compelled to scream loudly for help; Poll having administered a dose of toe-pecking that put her in dreadful pain for some days. This was too much to be borne, and the culprit received sentence of transportation. The footman was directed to sell or give him away,—and what afterwards became of him, we never learned. Now, though in this case we think it highly probable, that the mischievous threat had been taught the bird by the servants, yet Poll must have seen the effect it produced in occasionally increasing his allowance, though, doubtless, he did not calculate upon the final *dénouement*. But we must not allow old Grey-pate to detain our attention any longer. We have referred to his figure as admirably executed, and the singular crested *Ptyctolophus Leadbeateri*, and the beautiful *Platycercus palliceps*, are also charmingly done. The background landscapes are certainly a set-off to the picture; and though omitted in the plates of the Pigeons, will, we trust, in future be adhered to. The vignettes to each volume are very tasteful—the last particularly so, representing the tri-colour crested and love Parrots, by Stewart.

On the whole, we cheerfully give the meed of approbation to this beautiful, scientific, and moderate-priced series of ornithological illustrations, and hope to be able to welcome it, as its future volumes appear, with undiminished favour, to its termination. Nevertheless, in some respects, we think there might be a little improvement. The manners and habits of the birds, when known, might be more enlarged upon than they now are, many being very short and meagre. Ample space might be found for this in the curtailment, if not entire omission, of the biographies. Raffles and Bewick, indeed, we might submit to, and the portrait and memoir of the latter prefixed to the Parrots is interesting. But then Bewick had nothing to do with Parrots; and to have to wade through a hundred and twelve pages of a memoir of Aristotle, and eighty-two of Pliny, prefixed to accounts of the gallinaceous birds, is more than we could venture on; we have not had *pluck* to attempt it, and our copies remain uncut on these particulars. In fact, this savours rather too much of the "make-weight" system, and in future we hope will rather be honoured in the "*breach*" than in the observance. This we conceive not to be the place for long biographies, especially those of the eyeless ancients, whom we know where to find if we want them; though perhaps a pithy sketch of, and a look at, such bird-lovers (not *fanciers*) as Bewick, Wilson, or Audubon, is not to be objected to. We should, however, be sorry to say a word disparaging to so interesting and spirited an undertaking as this is, requiring, of course, an extensive sale to remunerate its projectors; we only wish its useful and attractive powers to be developed to the utmost possible degree.

EXTRACTS FROM FOREIGN SCIENTIFIC JOURNALS.

ENTOMOLOGICAL.

ABSTRACT OF DR. ERICHSON'S SYSTEMATIC DISTRIBUTION OF THE BOSTRICHIDÆ, (BARK BEETLES).

(From Wiegmann's "*Archiv für Naturgeschichte*," 1stes. heft, 1836.)

THE *Bostrichidæ* constitute a portion of Latreille's *Xylophaga*; but as this group consists of very heterogeneous materials, they have less affinity with any other genus of that tribe than with the *Curculios*. *Cis*, however, from the structure of its mouth, may be allied to the *Bostrichidæ*, but from which it still widely differs by its tetramerous tarsi. The apparent affinity of *Apate* with the *Bostri-*

chidæ is deceptive, for although they are pentamerous, yet the concealed joint is the first, and not, as in the *Bostrichidæ*, the fourth. This is also the case in some genera of the *Cleridæ*; I, therefore, consider that the most natural situation of *Apate* is between this family and the *Anobia*, notwithstanding their resemblance to *Bostrichus*. This appears to be confirmed by the discovery by Professor Ratzeburg (who, as he has informed me, was long struck by the remarkable similarity of the holes bored by *Apate* and the *Anobia*) of the larva of *Apate*, which in contradistinction to the footless larvæ of the *Bostrichi*, very much resembles those of the *Anobia*.

The *Bostrichidæ* may be divided into three very natural groups, characterized by the proportions of the head and thorax. In the first, the thorax is generally narrowed anteriorly, and encompasses the posterior portion of the head, leaving, however, the greater portion of it free, and for the reception of which there is a more or less considerable concavity beneath in front of the anterior coxæ. The head is anteriorly elongated into a short thick rostrum. In the second group the globose head is wholly retractile within the thorax, which arches itself like a capuchin over it, forming a deep emargination, beneath which, however, it is always even in the middle distinctly margined. The third group, lastly, which contains but one genus, has the thorax neither emarginate nor impressed beneath, and a free head frequently wider than the thorax.

GROUP I.—HYLESINES.

Head exerted, the rostrum short, thick, and advanced. The antennæ (excepting *Phloeotribus*) inserted at the sides of the rostrum. Thorax beneath anteriorly emarginate, with an impression (often obsolete) for the reception of the head. The third joint of the tarsus generally emarginate or bilobate.

GENUS I.—HYLASTES, *Erichs.* The funiculus of the antennæ seven-jointed; the knob four-jointed, orbiculate, compressed; the tibiæ externally denticulated. This genus contains, 1. *Hylastes ater*, Payk., which is the *Hylesinus piniperda* of Fabricius, as the type, with nine other species. But it is further separated into two divisions, viz. :—A. The mesosternum truncated anteriorly; the third joint of the tarsus cordate, not dilatated: and B. The mesosternum conical and prominent; the third joint of the tarsus dilatated and bilobate.

GENUS II.—HYLURGUS, *Latr.* The funiculus of the antennæ six-jointed, the club quadriannulate, subglobose; the tibiæ externally denticulated. The only known species is the *H. ligniperda*, *Latr.*

GENUS III.—DENDROCTONUS, *Erichs.* The funiculus of the antennæ five-jointed, the knob quadriannulate, suborbiculate and compressed. The tibiæ externally denticulated. The type of this is the *Bostr. micans* of Kugelan, frequently mistaken for the *Hyles. ligniperda*, Fab.; besides which it contains, 2., *Scol. terebrans*, Oliv., 3., *Dermestes piniperda*, Lin., and two others.

GENUS IV.—*PHLOETRUPES*, *Erichs.* The funiculus of the antennæ six-jointed, the knob quadriannulate, orbiculate and compressed. The tibiæ externally convex, muricate, and internally concave. This contains two Brazilian species, both new.

GENUS V.—*PHLOEOBORUS*, *Erichs.* The funiculus of the antennæ six-jointed, the knob quadriannulate, oblong, acuminate. The tibiæ compressed externally, denticulated. Contains three Brazilian species, all new.

GENUS VI.—*HYLESINUS*, *Fab.* The funiculus of the antennæ seven-jointed, the knob quadriannulate, oblong, acuminate. The apex of the tibiæ compressed externally, denticulate. The type is the *H. crenatus* of Fabricius.

GENUS VII.—*PHLOOTRIBUS*, *Latr.* The antennæ inserted in the front of the face, the funiculus five-jointed, the clava trilamellate. The tibiæ compressed, externally denticulated. The type and only known species is the *P. Oleæ*, Lat.

GENUS VIII.—*DIAMERUS*, *Erichs.* The funiculus of the antennæ six-jointed, the knob solid, suboval, compressed. The tibiæ compressed, externally obsolete denticulated. The only species known is the *Hylesinus hispidus*, Klug, from Madagascar.

GENUS IX.—*POLYGRAPHUS*, *Erichs.* The funiculus of the antennæ four-jointed, the knob solid, suboval, acuminate. The tibiæ externally denticulated. Comprising also but one species, the *Hylesinus pubescens*, Fab.

GENUS X.—*ECCOPTOGOSTER*, *Herbst.* The funiculus of the antennæ six-jointed, the knob solid, compressed, suboval. The tibiæ compressed, entire, with the apex uncinatè. Here range 1. *E. destructor*, Oliv., which lives in the Birch ; 2. *E. scolytus*, Herbst., which is destructive to Elms ;* 3. *E. pygmæus*, Fab. ; 4. *E. intricatus*, Koch., which is the *E. pygmæus* of Gyllenhal : it lives in Oaks ; 5. *E. multistriatus*, Marsham ; 6. *E. minutus*, Panz.

GENUS XI.—*CAMPTOCERUS*, *Lat.* The funiculus of the antennæ seven-jointed, the knob solid, compressed, suborbiculate. The tibiæ entire, their apex uncinatè. The species of this genus are confined to South America, and consist of the following, described by Fabricius :—1. *Hylesinus æneipennis* ; 2. *Hyl. fasciatus* ; 3. *Hyl. gibbus* ; 4. *Hyl. suturalis* ; 5. *Hyl. niger*.

* Some mistake appears to exist with regard to the species so destructive to the Elms in the vicinity of the metropolis, which must be this, and not the *E. destructor*, as supposed by our entomologists. The insect is committing ravages to a great extent, and unless some timely check be devised, it is to be feared that, in the course of a few years, not a single Elm will exist near London. The remedy already suggested is, that trees which are found to be infected should be immediately cut down and barked ; and it is supposed to be erroneous that only diseased trees are attacked : further observation has shewn that it is the male which prepares the tree for the reception of the female by boring holes in the bark. It has been supposed that the mortality occasioned in these trees was owing to their striking the root into the blue London clay, and thus becoming poisoned ; but that this is incorrect is proved by young as well as old trees being subject to the calamity.—ED.

GROUP II.—TRUE BOSTRICHI.

The head globose, retractile within the thorax. The antennæ inserted at the sides of the head, between the base of the mandibles and the eyes. The thorax produced anteriorly above the head. The anterior coxæ always approximate. All the joints of the tarsi simple.

GENUS XII.—XYLOTERUS, *Erichs.* The funiculus of the antennæ four-jointed, the knob solid, the labium parallelopiped. Here belong the 1. *Dermestes domesticus*, Lin.; 2. *Bostr. lineatus*, Oliv.; 3. *Bostr. 5. lineatus*, Adams, *Ann. de la Soc. Imp. des Natur. de Moscou.*

GENUS XIII.—CRYPTURGUS, *Erichs.* The funiculus of the antennæ two-jointed, the knob solid, the labium parallelopiped. The two following species are widely dispersed:—1. *Bostr. cinereus*, Herbst.; 2. *Bostr. pusillus*, Gyllenhal.

GENUS XIV.—HYPOTHENEMUS, *Westwood.* The funiculus of the antennæ three-jointed, the knob obsoletely annulated, the labium slightly narrowed towards the base. The only species known is the *H. eruditus*, West., *Trans. of the Entom. Soc. of London*, part i., page 34, plate 7, figure 1. The author remarks that there is evidently some mistake in the figure of the *ligula*, for it does not exist in any of the *Bostrichidæ*, as figured by Mr. Westwood.

GENUS XV.—CRYPHALUS, *Erichs.* The funiculus of the antennæ four-jointed, the knob four-jointed, the labium oblong, scarcely narrowed towards the base. The *Apate Tiliæ* and *Apate Fagi* of Fabricius come here, as also the *Bostrichus asperatus* of Gyllenhal.

GENUS XVI.—HYPOBORUS, *Erichs.* The funiculus of the antennæ five-jointed, the knob quadriannulate, the labium subovate. A small species common in the south of France and Portugal, and indicated as *Bostr. fici* by Dejean, forms the type of this genus, by the name of *H. ficus*: it is three quarters of a line long.

GENUS XVII.—BOSTRICHUS, *Fab.* The funiculus of the antennæ five-jointed, the knob quadriannulate and tunicate, the labium triangular. The type of this genus, which is very rich in species, is the *Dermestes typographus* of Linné. Very few exotic species are known, but the very wide dispersion of some is remarkable, for instance, the *Bostr. ferrugineus*, Fab., is found in all parts of America, as well as in Madagascar.

GENUS XVIII.—AMPHICRANUS, *Erichs.* The funiculus of the antennæ two-jointed, the knob sub-solid, the labium triangular. The only known and beautiful species is a native of Brazil; a solitary specimen of it is in the Berlin Royal Museum; its specific character is *A. thoracicus*. *Niger, nitidus, capite thoraceque sanguineis, elytris subtiliter punctatis, apice oblique truncatis, unidentatis*—length, three and a half lines.

GENUS XIX.—CORTHYLUS, *Erichs.* The funiculus of the antennæ one-jointed, the knob quadriannulate, the labium triangular. Here come 1. *Bostr. compressicornis*, Fab., 2. *Bostr. fasciatus*, Say.

GROUP III.—PLATYPUS, *Hbt.*

Head exserted; thorax cylindrical, impressed laterally for the reception of the legs; the tibiae short, the anterior externally convex, transversely porcate; the tarsi slender, the first joint very long. The genus *Platypus* is the only one belonging to this group, and is widely distributed over almost the whole earth. The difference of the sexes is frequently striking. The male is generally to be distinguished by the larger size of the first joint of the antennæ, and the female by the dentate apex of the elytra.

We purpose in our next number giving an abstract of Mannerheim's paper on the *Staphylinidæ*, which, from its not being generally accessible to the English entomologist, may prove acceptable.

 BOTANICAL.

EDIBLE FUCUS.—The Philippines yield a great proportion of the large quantities of edible bird's nests which are consumed in China, as well as now also in Europe. At present, we will merely draw attention to the edible sea-plants found upon the coasts of the Philippine islands, as well as upon those of the Bashees, the islands of the empire of Japan, the Moluccas, &c., and which serve both as articles of export and food. In the markets of Macao and Canton large chests of this dried fucus are to be found, imported from Japan. The species which supports this branch of commerce is the *Sphærococcus cartilagineus*, var. *cetaceus*, Ag., which is extremely abundant in India, and which, eaten by the Salangane (*Hirundo (Cypselus) esculenta*, Lin.), is thence used for the construction of her nest; for the substance, which has become a jelly in her stomach, is rejected, and with this she forms her nest. These celebrated Indian bird's nests, which, in their original state, are soiled with feathers and dirt, are conveyed to China, where there are large establishments for the purpose of cleansing them, for which particular instruments are employed; and yet they are scarcely ought else than the relaxed *Sphærococcus cartilagineus*. In their preparation, however, such a variety of condiments are used that they may justly claim a high rank amongst the epicurean dishes of the Chinese. The Japanese have long been acquainted with this plant, and artificially prepare the substance of the nests. The fucus, after being previously powdered, is boiled into a thick jelly, which they then pour out in long strings like Macaroni, and which is known in commerce as *Dschinschan*, called by the Dutch *Ager-ager*. The Chinese eat the bird's nests, both the real and the artificial, as sauce to their meat. The Europeans resident in China prefer them prepared in the shape of a jelly, and to which the *Dschinschan* is excellently adapted; for one boiling is sufficient to transform the dried substance into a jelly,

which is then made palatable with wine or the juices of fruits. The dried *Dschinschan* can also be cut into small pieces and thrown into hot soup, where, in the space of a minute, it dissolves, and thus resembles transparent Macaroni.

We have enlarged upon this subject because latterly much has been said about the *Carraghean*, which is nothing else than the dried *Sphærococcus crispus*, which is found in large quantities on the western and northern shores of England, and which, doubtless, possesses the same qualities as the *Sphærococcus cartilagineus*, var. *cetaceus*. We can, however, by no means imagine that the jelly obtained from it possesses any other but a highly nutritive quality, which is, at the same time, not at all oppressive to the digestive organs.—Meyen, in Wiegmann's *Archiv*.

PARAGUAY TEA.—Rengger, in his *Travels in Paraguay*, confirms the statement of Aug. St. Hilaire, that the Tea of Paragua and the Paraguay Tea are the produce of one and the same plant. The differences of taste are caused by the modes of preparation and preservation. The plant which produces it is the *Ilex Paraguariensis* of St. Hilaire; it resembles the Pomegranate tree in form and in the shape of its leaves, yet, when full grown, it is considerably larger and thicker. The elliptical leaves are directed upwards, and its small white blossoms hang in bunches. The smaller twigs are cut off and baked over a slow fire, and then broken up by stamping, that the tea may be more closely compressed; it is then packed in square leathern bags, which are called *zurrones* or *tercios*, and containing eight arrobas. The finest kind of Paraguay Tea consists exclusively of the leaves of the tree, which, after being roasted, are coarsely pounded in a wooden mortar, and is called *Caa mini*. The common sort, which, besides the leaves, contains also the smaller twigs, is called *hierba de palos*; and there are several surreptitious or mixed kinds. This tea, which is usually called *hierba* in Spanish, must be only coarsely powdered, else it loses both smell and taste, and the mouth, in drinking it, is filled with the dust. Nor must it be over-roasted, on account of the resin it contains; and the dealers have a ready test for this by taking a little in their hands and slightly blowing it, when, if the greater quantity flies off, they condemn it. This tea loses its flavour in a couple of years, even if the tercios be compressed as hard as stones, but where exposed to the air this naturally takes place much earlier. When it becomes old and strong it can only be used as a colouring matter for dyeing black tints. This *hierba*, or tea, passed current formerly in Paraguay as money, and its commerce consequently was but a system of barter.

THEA COMMUNIS.—The discovery of the tea plant in Upper Assam promises to become of considerable importance to British commerce. That it was cultivated in Ava, the Birman Empire, as well as the eastern frontiers of Thibet, has been

long known, but its existence in Upper Assam, within the dominions of the East India Company, and spread over a district of hundreds of miles, gives promise of its being cultivated upon an extensive scale : indeed, extensive plantations have been already formed in the mountains of Camun in Sirmare, and Gurwhal between the upper Jumna and the Ganges.

ZOOLOGICAL.

CRUSTACEA.—We find that Mr. J. F. Brandt has published at Moscow, a *Conspectus Monographiæ Crustaceorum Oniscidorum*. He divides them into two tribes, the *Ligies* and the *Oniscinées*. The first tribe forms two genera, *Ligia* and *Ligidium*. The second tribe is separated into two sections, the *Porcellionées* and the *Armadillins*. The first are divided into *Hexarthrica*, containing the genera *Trichoniscus*, and *Platyarthrus*, and *Schizarthrica*, containing the genera *Porcellio*, *Oniscus*, and *Philoscia*. The second section of the *Oniscinées*, viz., the *Armadillins* are divided into the *Armadillidies* and the *Cubaridés*. The first contains only the genus *Armadillidium*. The second are again subdivided into *Monoexocha*, containing the genera *Cubaris* and *Armadillo*, and the second subdivision, the *Diplorexocha*, contains the single genus *Diplorexochus*.—Hermes.

THE GOSSAMER.—A pupil of the Academy at Metz has written to the Academy of Sciences, stating that he has detected that the film which floats so abundantly in the air on fine days in the Autumn, is produced by Spiders. M. Coulier, however, says that he has discovered that they are produced by an *Acarus* described by Geoffroy, and that, besides, the remains of this creature are ordinarily found attached to these white and tenacious filaments. Latreille constructed the genus *Gamasus* of this *Acarus*, and in fact it is frequently found spreading wide tissues over trees, but it can scarcely be supposed that these filaments are exclusively produced by the *Acarus*. Ray, Lister, and the majority of English Entomologists, since their time, ascribe it to a Spider, whose proceedings have been often watched.

GEOLOGICAL.

AMBER.—M. Aycke,* who for many years has farmed the collecting of Amber in Prussia, and who consequently has had the opportunity of inspecting it in large quantities, conveys much interesting information upon the subject, in the

* *Fragmente Zur Naturgeschichte des Bernsteins*, Danzig, 1835, 8vo.

work noticed below, whence we abstract the following account.—The opinion now generally entertained is that Amber is a fossil resin, and that the trees which produced it were coniferous, and belonged to extinct species of the genus *Pinus*. M. Aycke observes that Amber, as found in its native beds, has evidently been deposited by violent causes, floods, &c. The best proof of which is produced both in the manner in which the Amber is deposited, as also in the pieces of rubbed wood found intermixed with it, and which are more or less transformed into carbon. The lumps of wood usually found in the vicinity of Amber, all belong to the *Coniferae*, and Mr. Aycke has even discovered some in which the Amber was still to be found lying between the concentric yearly layers, and which were thereby forcibly separated from each other. In the summer of 1835, a small deposit of Amber was found a few feet beneath the surface, in the Thiergarten at Berlin; but there it was deposited in a pure sand, and the pieces were not of an uniform colour. Some pieces of wood which were found with the Amber, M. Meyen had the opportunity to examine, and the results were, that the microscope distinctly showed that the large pieces of wood transformed into carbon, evidently belonged to the genus *Pinus*. A smaller piece, almost entirely carbonized, is rubbed into a nearly globular shape on one side, and a third piece, two inches and a half long, appears to be the scale of a Pine-apple of very considerable dimensions. Besides these pieces of strongly carbonized wood, a small piece was found in a very excellent state of preservation, belonging to some amentaceous tree, but extremely difficult to determine of what genus. Near Brandenburg, a deposit of Amber has, also, been found, which appears to yield large pieces in considerable quantities. M. Aycke gives us very precise information upon the discovery of Amber in connection with roots, which might easily mislead to the supposition that this Amber had been secreted by their encompassing and enclosing fibres. He notes his astonishment at finding these roots in their natural upright position with their fibres directed downwards, still fresh and flexible as when living, and that there was not the least trace of carbonization to be found in them; but in the strata above there were no stems or larger ramifications of these roots; and indeed roots are but seldom found therein of the thickness of a quill, for they generally consist of fasciculated fibres forcibly rent asunder, and which, as in the *Coniferae*, branch off in the finest and most delicate ramifications. These fibres of roots, not only encompass considerable pieces of Amber, but frequently their capillary ramifications hang firmly attached to them. M. Aycke observed that these roots do not, by any means, belong to the *Coniferae*; and M. Meyen, by the kindness of Alex. V. Humboldt, obtained some for examination, and microscopic investigation proved that they were *dicotyledonous*. It was not possible to detect that they had secreted the Amber; but the very opposite opinion is entertained by M. Meyen.—Wiegmann's *Archiv*.





Golden Pigeon (Columba vitiensis)

ORIOLES GALBULA.

FAMILY.—DENTIROSTRES.

GENUS.—ORIOLES.



THE GOLDEN ORIOLE.



BY WILLIAM MAC GILLIVRAY, A.M., F.R.S.E., M.W.S., &c.

THE Golden Oriole, which by Temminck is classed among the omnivorous birds, and by Cuvier is referred to the Dentirostral Family of the Order *Passeres* or *Insessores*, belongs to a genus formerly of great extent, but by modern ornithologists reduced to a small group, of which the species present the following characters :—

Bill rather long, stout, nearly straight, rather broad at the base, compressed. Upper mandible having the dorsal outline slightly arched, the ridge narrow, the sides flat and sloping at the base, slightly convex and more inclined towards the end, the edges sharp, with a slight notch close to the small, slightly deflected tip. Lower mandible with the angle moderately long and narrow, the sides nearly erect, the edges sharp, the dorsal outline nearly straight. Mouth of moderate width. Tongue slender, emarginate and papillate at the base, thin and horny toward the tip, which is bifid. Nostrils oblong, bare in the anterior part of the large nasal membrane, which is feathered. Eyes of moderate size; eyelids feathered.

Head oblong, moderately large, the forehead slightly rounded. Neck rather short. Body ovate, compact. Legs rather strong, short: tarsus short, compressed, covered anteriorly with seven large scutella, posteriorly with two plates united at a very acute angle, and several transverse rugæ below. Toes of moderate size, covered above with a few large scutella, papillate beneath; the first stout, of about the same length as the second; the fourth a little longer, and united at the base to the third, which is considerably longer. Claws of moderate length, arched, compressed, laterally grooved, acute; that of the hind toe much stronger.

Plumage generally blended, the feathers oblong and rounded. Short bristles at the base of the bill. Wings rather long, of seventeen quills; first primary very short, being scarcely more than a third of the length of the third, which is longest; second shorter than fourth; secondaries of moderate length, broad, and rounded. Tail rather long, straight, slightly rounded, of twelve rather broad, rounded feathers.

In the systems of Linneus and Latham the genus *Oriolus* was composed of a number of species having very little affinity to each other, having been placed together, as it would seem, more on account of a kind of agreement in the colours of their plumage than from a similarity in the form of the bill, or in their habits. The genus thus constituted has, however, been broken up by Daudin, Vieillot, and others, into several genera, so that at present it contains only those species, all belonging to the old continent, which bear a strong resemblance in form to the Golden Oriole.

This beautiful bird is about the size of the Blackbird (*Turdus merula*), which it also resembles in form, although its tail and feet are considerably shorter, and its wings proportionally longer. Indeed, its resemblance to many of the Thrushes is such that several authors have named it the Golden Thrush. It is very intimately allied to two or three Indian and Chinese species, which resemble it, not only in form, but also in colour, although characteristic differences are apparent. As it agrees in every particular with the generic character given above, it is unnecessary, in describing it, to repeat the details already presented.

The male has the plumage blended, the feathers being oblong, with disunited barbs, those on the fore part of the head short. The wings, when closed, reach to within an inch of the end of the tail, which is nearly even at the end. The bill is of a light brownish-red colour; the iris, according to Temminck and Montagu, red; the feet blueish-grey; the claws of the same colour as the bill. The plumage is generally of a rich and pure gold colour. Between the bill and the eye is an oblong black spot or band. The wings are black, but the smaller coverts are yellow, as are the margins of the wing, the tips of the primary coverts, and the tips of all the quills, except the two outer; while the external margins of the quills are yellowish-white, those of the two outer excepted. The two middle tail-feathers are greenish-yellow at the base, brownish-black in the rest of their extent, except the extreme tips, which are yellow; all the rest are black, with the extremities bright yellow, the space of that colour gradually enlarging on the outer feathers.

Length to end of tail $9\frac{1}{2}$ inches; wing from flexure 6 and 2-12ths; tail 3 and 3-12ths; bill along the ridge 1 and 1-12th, along the edge of the lower mandible 1 and 3-12ths; tarsus 1; first toe $\frac{1}{2}$, its claw 5-12ths; second toe $\frac{1}{2}$, its claw $3\frac{1}{2}$ -12ths; third toe 9-12ths, its claw 5-12ths; fourth toe 8-12ths, its claw 4-12ths.

The female is somewhat less than the male. The bill and feet are similarly coloured. The plumage of the upper parts is yellowish-green, the forehead lighter, and the upper tail-coverts greenish-yellow. The fore part of the neck is pale greenish-grey, its sides greenish-yellow; the breast white, the sides and lower tail-coverts yellow; the throat marked with longitudinal pale-brown lines, the breast with larger lines of a brownish-black tint. The wings are brown, their

edge greenish-yellow ; the tips of the quills, excepting the outer, and the primary coverts, pale-yellow. The tail is dark brown, the terminal yellow spot on the feathers of much less extent than in the male.

Length to end of tail 9 and 2-12ths ; wing from flexure 6 ; tail 3 and 3-12ths ; bill 1 and 1-12th.

The young, in its first plumage, is of a dusky yellowish-grey tint above, each feather having the central part greyish-brown ; the lower parts yellowish-white, each feather with a central brown line ; the sides and lower tail-coverts bright yellow ; the wings and tail brown, marked with yellow as in the adult. The male is easily distinguished from the female by its lighter colour.

The species most nearly allied to the Golden Oriole (*Oriolus galbula*) are the Yellow Oriole (*O. aureus*), the Chinese Oriole (*O. Chinensis*), and the Blackheaded Oriole (*O. melanocephalus*). Whether the first of these be really distinct I can scarcely venture to affirm. It is somewhat smaller, its wings are proportionally shorter, its bill larger, but the colouring is precisely similar, only there is a small black spot behind the eye, in addition to the black local space of the Common or Golden Oriole.

This latter—the only species of the genus that is ever seen in Europe—arrives in France and Italy toward the end of April. It is not uncommon in many parts of Germany, but is rare in the northern countries, and in England is not a regular visitant, a few individuals only having been seen there at long intervals ; so that with us it ranks merely as an accidental straggler. It is said to prefer low, wooded districts, and to resort chiefly to the margins of forests, residing among the lower branches of the large trees, or in the thickets. Its food consists chiefly of insects and larvæ, but as the season advances it feeds also on berries, and occasionally visits the gardens and orchards, where it manifests a partiality to cherries.

Its nest is described by authors as of an oblong form, shaped like a purse, having its aperture above, and suspended from a forked branch, some say at the top, others at the lower part of a tree. It is composed externally of long straws neatly interwoven, internally of mosses and lichens, with a lining of grass, and sometimes wool. The eggs are four or five, of a regular oval form, smooth, white, with a few brownish-black spots, sometimes intermixed with paler markings. The young continue with their parents after they come abroad, and the families do not unite at the period of their departure, which takes place about the end of August.

The young are said to be difficult to rear, and not to thrive in captivity, otherwise, creatures so beautiful would, no doubt, be great favourites as cage birds, although their natural notes are loud and shrill, and their song deficient in melody.

I have not met with any account of the digestive organs of this species, nor, indeed, with any tolerable description of its manners. Judging from its external appearance, its organization is probably similar to that of the Thrushes, which have a narrow œsophagus, a rather powerful gizzard, lined with a horny rugous

membrane, and an intestine of moderate length, with very small cœcal appendages. The form of the wings and tail shews that the flight must be powerful and sustained, similar to that of the Redwing and the Fieldfare; and the feet, although fitted for hopping on the ground as well as for gliding among branches, are, perhaps, better adapted for the latter purpose.

Although the Golden Oriole has occurred in several counties in England, and in a few instances in Ireland, no authentic case of its occurrence in Scotland has been recorded, at least to my knowledge. The birds in the museum of the University of Edinburgh, mentioned by Mr. Selby as having furnished subjects for his drawings, and as having been shot on the Pentland Hills, were brought from France by the late Mr. Wilson, janitor to that university.

REMINISCENCES OF THE RHINE;

ORNITHOLOGICAL AND ENTOMOLOGICAL.

(Concluded from page 207).

Cerambyx Textor.—With its long horns, scrambling and out-stretched legs, large size, and dark-black colour, the uninitiated observer would start with disgust, exclaiming, “what a frightful creature!” if an Entomologist exultingly presented him with this fine insect. And so it is, to those who judge of these and some other similar tenantry of the insect world, under the weight of early associations or prejudices: but to the Entomologist, its apparent deformities assume a different aspect; and in each limb, articulation, and joint, and specific character, clearly and strongly developed as they are, he pronounces it to be one of the most attractive specimens of insect perfection. With such feelings I welcomed the slow march and dignified attitude of one of these fine *Cerambyces* emerging from the sod on the side of a pathway near Aix-la-Chapelle. I secured him, as well as circumstances would permit, in folds of paper, but in the course of the following night he escaped to undergo, doubtless, the melancholy fate of being disposed of like a common Black Beetle by the thoughtless chambermaid, who might find him perambulating my bed-room floor next morning.

Green Locust (*Gryllus viridissima*).—I found only one specimen of this conspicuous insect, on the stem of a Willow, near Strasbourg. I confined it in a tin box with two or three other insects, one of which was a *Carabris* of some size; when, to my astonishment, on opening the box on the following day, I found

only the locust, who had devoured the whole of his companions, with the exception of a few tarsi and remnants of limbs and antennæ. This is not the first instance I have known of the voracious appetite and extraordinary ventral capacity of these insects, which are usually supposed to live only on vegetable food.

Lygæus apterus.—One of the wingless bug family, a pretty attractive insect, with its party-coloured elytra, black and red. On the gravelly esplanade before alluded to at Carlsruhe they actually swarmed; hundreds and thousands were in rapid motion, particularly on those parts which were fresh turned up by the rakes or scufflers.

In addition to the above, to which, I believe, I have affixed correct appellatives, some others were taken which I can only refer to generally. In the forests of Germany, one species of the genus *Scaritidæ*—formerly, in the simpler days of entomological science, known and classed with the *Cerveladæ*, or Beetle tribe—was not uncommon. A stout, well-conditioned Beetle, about an inch long, with globular, projecting eyes, broad thorax, on which the head seemed to be indented or inlaid without any intermediary cervicular process, with heavy jaws fitted for all purposes of laceration of food or personal defence. I never met with one of these stout little fellows fearlessly preparing for resistance when under the restraint of an entomological finger and thumb, without comparing them with those squab, short-bodied, square-built, broad-shouldered, hard-featured, immoveable-eyed sort of people, of the genus *humanus*, so common in the world. I feel confident that your readers will recall, in a moment, a dozen such to their recollection; men full of health and vigour, of iron muscle and nerve, ready and willing to fight their way through the world unaffected by times or circumstances under which more pliant characters would quail; men who, if they shook you by the hand, would make every joint crackle under their hearty grasp, and who, if invited to dinner, would swallow an entire first course, without fear of indigestion or inconvenience.

It may not be irrelevant to insert, in an article on entomological notices, some information respecting the destructive powers of those minute insects, the *Bostricidæ*, on the forests of Germany, received from M. Warnkynck, a very intelligent Inspecteur des Chasses, resident at Klortter, near Rippoldsau, in the middle of the Black Forest. On looking over his collection, he pointed out the following as most injurious:—

<i>Bostrichus lineatus</i> .	Stephens' Catalogue, p. 143, <i>linearis</i> ?	Most destructive of all.
<i>B. typographicus</i> .	ditto 145	Very bad.
<i>B. villosus</i> .	ditto 144	
<i>B. calcographicus</i> or <i>laricis</i> .	ditto 145	
<i>B. curiaderis</i> .		On the White Pines.
<i>B. pinastri</i> .	Found near Carlsruhe.	On the <i>Pinus sylvestris</i> .

With one other reference I shall conclude, and perhaps I could not select a more appropriate one, recalling as it does the closing in of those delightful continental evenings when, after the setting of a sun in glory and splendour unknown in our hazy and turbid atmosphere, the dews have fallen and left the world in darkness, the still air glowing with radiant warmth unaccompanied with damps and chills, rendering it so treacherous a temptation for enjoyment in less favoured climates. I allude to the Fire Flies (*Lampyrus Italica* ?), which, availing themselves of this sweet time of night, now light their phosphorescent lamps and flit before the traveller like twinkling stars. There is something mysterious and unearthly in their silent flight; slowly sailing in suitable harmony with the quiescence of the time of night, bursting into brilliancy, as it were, from vacancy, and then as suddenly vanishing into nothingness. Not an evening passed after a sultry day in the districts of the Upper Rhine, from Brühl and Andernach up to Baden, when these lovely, ghost-like insects might not be seen. The Germans call them by a name implying the lamp of the dead, and a more appropriate one could not be applied; for we might well conceive that, if the spirits of departed beings were allowed to revisit this nether world, they would gleam and flit before us with that gliding, solemn, silent motion, peculiar to the Fire Flies of Germany.

E. S.

NOTES ON THE MONTHS.

JANUARY.

“THERE’S beauty all around our paths, if but our watchful eyes
 Can trace it ’midst familiar things and through their lowly guise;
 We may find it in the winter boughs as they cross the cold blue sky,
 While soft on icy pool and stream their pencilled shadows lie;
 When we look upon their tracery by the fairy frost-work bound;
 When the flitting Redbreast shakes a shower of crystals to the ground.”

Mrs. HEMANS.

THE observation of the natural appearances of the year during each of its revolving months, is an occupation suited to every rank and age, and is productive of the purest and most exquisite enjoyment of mind, as well as of the most salutary influence upon the body. Yet this source of gratification and improvement

is too generally neglected, either from a wrong bias being early given to the mind, or from other defects of education. Scarcely has the infant mind begun to look abroad and survey the face of nature, ere his seniors turn the attention of the youthful inquirer to man's productions and his occupations, and bestow upon him only such an education as will fit him to follow in the path themselves have trod. Now, while we aim at rendering the mind of youth a rich store-house of whatever is most excellent among the productions of human genius, we should likewise aim at making it a mirror fitted to reflect whatever is most lovely in nature. For this purpose a careful examination of the processes of nature throughout the different seasons of the year should enter into our general systems of education. In January the suitableness of the arrangements adopted both by the animal and vegetable kingdom to the existing conditions of the atmosphere might be pointed out.

The earth itself undergoes a temporary but extensive change on its surface, the colour of which, at other times, is either green or brownish-black—a colour much more favourable to the escape of the heat which the earth had received from the suns of the preceding summer than white. The great humidity of the air, also, in December and January, contributes to abstract much of the heat from the earth, which is hindered from receiving any from the now distant sun by the foggy state of the atmosphere. The retention of the remaining heat is, therefore, a most desirable object; to effect which, so soon as the temperature falls below a certain given point, the surface of the earth has its colour changed to white, by which the radiating power is greatly altered and reduced. In the northern parts of Britain, the colour of the fur of the Hare and the plumage of the Ptarmigan become white, for a similar reason. The fur of those animals which cannot change their colour becomes finer and thicker, which then serves better to guard them against the cold. This renders the furs of animals of northern countries more suitable as a protection for man when they have been killed in winter.

A certain temperature is necessary for vegetables to retain their vital principle; hence those which are of a large size, such as shrubs and trees, which do not *die down* to the ground like herbaceous plants, become coated with hoar-frost; so that their surface is universally rendered white, and their internal warmth retained, by the same means, and for the same reason, as that of the earth. The winter landscape is, therefore, not without its attractions, either that of novelty, arising from the suddenness with which the change above mentioned takes place, or of the more enduring feeling of interest which will spring from an inquiry into the causes and objects of these changes. A walk in dry, frosty weather, when suitable clothing is worn, is at once healthful and pleasant, and may be rendered productive of lasting happiness and enjoyment, by having the attention directed to the numerous proofs, with which every situation and season abounds, of the continued operation of those nicely-balanced laws which had their origin and have their maintenance in the mind and will of the Great Architect of the Universe.

DISPERSION OF PLANTS.

[FROM A CORRESPONDENT].

FROM a memoir read to the Botanical Society of London on Thursday, the 17th of November, on Local Botany, it appears that two-thirds of the British species grow within about twenty-five miles of the metropolis; also that five-sixths of the British genera and nine-tenths of the British natural orders are found within these bounds; that the greater part of the British plants are to be found in the continental floras of Europe; that upwards of 300 grow in the United States of America; that the flora of a part of Hindostan, by Wight and Arnott, containing about 2800 species, comprises not more than 30 British species; and among the 6000 plants of tropical America there is not one dicotyledonous species, and only a very few monocotyledonous species. It appears that the genera common to this country and the Indian flora above cited are 120, being four times the amount of common species; and that the genera common to England and the equinoctial flora of America are 270. The author farther states that one-half the British species, and above two-thirds of the British genera, grow in any parish of moderate extent; also that he collected, classified, and described 670 vascular species growing on Hampstead Heath and in the woods and fields adjoining; that latterly he has gathered about 900 species of the same kind (vascular) within twelve miles of Croydon, and has reason to believe that many more exist in that district.

Dr. Murray, an acute observer and excellent botanist, author of a valuable work on the wild plants of the north and east of Scotland, entitled *The Northern Flora*, some years ago published in Jameson's *Philosophical Journal*, a paper, in which he states that "a great proportion of Scottish plants are found in the Valley of Alford;" and, again, that "the mass of Scottish species grow in the environs of Paris." It farther appears that the extent of Great Britain, from the Channel Islands to the extremity of the Mainland in Shetland, is equal to the extent of that part of continental Europe from the Gulf of Venice to the north end of the Peninsula of Jutland; but the number of species in these parts of Europe is more than double the number found in Great Britain and Ireland, although the average temperature of this country is about equal to that of Mid Europe; and, with the exception of Switzerland and part of Hungary, the range of elevation is greater: from which it would seem that the comparative deficiency of species here is, in some degree at least, to be attributed to our insular situation.

NOTICES OF THE CAPTURES OF INSECTS;

WITH CURSORY OBSERVATIONS THEREON.

BY J. C. DALE, ESQ.

(Continued from page 13.)

COLEOPTERA.—*Carabus auratus*.—Two specimens of this fine and rare insect were taken at the same time with the *C. intricatus*, by Mr. Bluett, of Taunton, (to whom I am indebted for a specimen), at Shobroke, between Crediton and Exeter.

Omalothea ruficollis.—I have taken another specimen of this insect at Lulworth, this year, as well as the variety called *varia*, which is nearly black.

Anomala Frishii.—I formerly took this insect in abundance at Mount Misery, near Christchurch, Hants, amongst which there was a single specimen of the green variety, the *A. Julii*. Subsequently, I took a solitary individual of *A. Frishii*, near Parley, inland; and I have this year received, from the latter place, four specimens of the variety *A. Julii*, as well as an intermediate variety, but not a single one of the *A. Frishii*.

Aphanisticus pusillus.—I took this insect on the 20th of May of the present year, both at Lulworth and Glanvilles Wootton, by brushing grass.

Sibinia arenaria.—I found this in abundance at Black Gang Chine and Freshwater Bay, in the Isle of Wight, also, this year. The first pair I possessed were presented to me by Mr. Kirby, who, in company with Mr. Spence, captured them near Exmouth, in Devonshire.

Sibinia primita?—I have found this in plenty at Lulworth, and a single specimen at West Hurne.

Galeruca rustica.—The only locality on record for this insect, is Whittlesea Mere. I, however, took one, two or three years ago, at Plumley Wood, Dorset.*

Cryptocephalus bipustulatus.—I have taken at Knighton Heath, near Dorchester.

Cryptocephalus Moræi.—One specimen of this I found with the last, a second at Glanvilles Wootton, and some others at Charmouth.

NEUROPTERA.—*Hemerobius fimbriatus*.—This insect, which is figured by Curtis, appears to be identical with the *H. hirtus* of the Linnean cabinet.

STREPSIPTERA.—*Stylops Kirbyi*.—On the 12th of May, this year, I saw two individuals flying together amongst some brambles. One I was lucky enough to

* It also occurs in the Woods of Kent.—Ens.

catch, and a second the day following : a third I found dead in a cobweb at the entrance of a Bees' nest, and two others, very much mutilated, also in a cobweb.

HYMENOPTERA.—*Zaræa fasciata*.—I took this insect, for the first time, at Middelmarsh Common, this year.

Banchus Farrani, (Curtis, pl. 588.)—Two specimens of this insect I took twelve years ago, on Parley Heath.

Bracon denigrator.—I took this insect, which is figured by Curtis, pl. 69, near the Copse, at Parley Heath.

Tengyra Sanvitali.—This, which is *thought* to be the male of *Methoca Ichneumonides*, I took a specimen of at Durdle Door, near West Lulworth, on a thistle, on the 15th of July, 1835 ; and I took two more on the 11th of July this year, one of which I gave to my friend, Mr. Curtis, who seemed surprised at the capture, and did not previously possess a British specimen ; but he had taken three or four of the *Methoca*, at Ramsdown, Hants, as well as at Black Gang Chine, Isle of Wight, where the Rev. Mr. Rudd also took it, and to both of whom I am indebted for specimens.*

Hedychrum ardens, and *Chrysis succincta*.—I took these in company, at Durdle Door, near Lulworth, which appears to be an excellent locality for choice insects ; for, three or four years ago, I captured there, in the space of a week or ten days, twenty or thirty species new to my cabinet, amongst which were *Halictophagus Curtisii*, figured by Mr. Curtis in his *British Entomology*, pl. 433, *Hesperia Actæon*, (*Brit. Ent.*, pl. 442), *Encyrtus pulchellus*, Curt., and minute Hymenoptera of the genera *Eulophus*, *Ceraphron*, *Mymar*, *Rogas*, *Chelonus*, *Aphidius*, &c., in profusion.

Cerceris ornata.—This I took last year, at Black Gang Chine, in August, as also,

Cælixys Vectis, (Curt. *Brit. Ent.*, pl. 349).

Osmia Tunensis.—It appears from the MSS. of the late Captain Blomer, that he bred this insect from the shell of a species of *Helix* ; and I possess a memorandum of *Osmia atricapilla* having been also found in a *Helix*.†

* There is not the least doubt of the *Tengyra* being the male of the *Methoca*, for M. Wesmael, of Brussels, has repeatedly taken them *in copulâ*. The *Tengyra* was introduced to the British Fauna, by our friend, Mr. Shuckard, in 1833, who captured two specimens at Hampstead, as well as many of the *Methoca* ; and he informs us that he has taken a single specimen of the *Tengyra*, in August, this year, at Birch Wood, in Kent.—EDS.

† The specific name of the last *Osmia* should be *xanthomelana*, it being the *Megachile xanthomelana* of Kirby, standing as such both in his *Monographia* and in his cabinet, which is remarkable, as it is evidently a true *Osmia*. It is a question, worthy of determination, which is the true instinct of the creature?—whether to form a nest of clay for itself, as it is shown to do by the observations and specimen presented by Mr. Waterhouse to the Entomological Society ; or to adapt the vacant shell of a Snail to the purpose ? We incline for the former ; yet, possibly, it may only build for itself in case of not finding a suitable

LEPIDOPTERA.—*Vanessa C. album*.—I observed this insect here on April 22, this year, for the first time since October, 1816, when, and prior, it was always in great profusion in the autumn.

Thecla pruni.—I found at Monk's Wood, Huntingdonshire, as, also,

Thecla W. album, in a wood at the same place, separated merely by a turn-pike road from the former, but each seemed confined to its own wood.

Lycæna Corydon.—I took this insect last year, on a heath in the New Forest.

Lycæna agestis.—I took a specimen of the variety of this insect, which resembles the *L. salmacis*, on the 5th of August, near Lyme Regis, where Messrs. Queckett and Paul took two others, also, in the beginning of August: all three were females.

Acherontia atropos.—I am informed by Mr. B. Morris, that he found, in September, 1835, at Charmouth, a larva of this insect, similar to the figure of it in Fuessly's *Archives*, and like the one observed by Captain Blomer, which I mentioned in my paper, in the 1st number of the present publication.*

Agrotis nebulosa.—But two or three specimens of this insect were known until captured this season by Mr. Raddon, on the Burrows of Appledore, Devonshire.

Catocola promissa.—I found the wings of this insect at Glanvilles Wootton, on the 13th of July, this year, and this is the first indication I have observed of its existence here.

Catocola Fraxini.—I possess a specimen of this which was taken at Cranborne, Dorsetshire, about fifty or sixty years ago.

Charissa pullaria.—On the 5th of August, this year, I took this insect, both typical and varying from dull white to a pale black, and so much resembling a variety of *C. obscuraria*, that I feel convinced these, as well as the *C. dilucidaria* and *C. serotinararia* are all varieties of one and the same species.

Siona dealbata.—On the 27th and 29th of June of the present year, I took a couple of specimens at the Caundle Holts, and it was taken at Langport, in abundance, by Messrs. Queckett, Paul, and Serrell.

Scopula ferrugalis.—I took on the 2nd and 8th of November, 1828. The late Captain Blomer found it, also, in November: but Samouelle gives June as the time of its appearance.

Scopula longipedalis.—The late Captain Blomer took this at Teignmouth, Devon; and I have taken lately a couple of specimens at Lulworth and Torquay.

place for forming its nest—such as the shell of a Snail. We also know that this species will form its cells amongst heaps of Oyster-shells or accumulations of garden rubbish. Robineau Desvoidy, and other French Entomologists, have observed similar habits in species of *Osmia*, whence one is named *Osmia helices*.—EDS.

* This is a variety produced, probably, by disease, or the infestation of a *Trogus*.—EDS.

Geometra degeneraria.—I saw this insect on the 20th of June, and captured it on the 12th of July, this year, amongst brambles, near Rufus' Castle, Isle of Portland, and observed two or three more.

Geometra sinuata.—Taken, in June, 1829, by the late Captain Blomer, at Ugbroke Park, Devon, and at Langport, by Mr. Queckett, in July, this year.

Geometra berberata.—I took a specimen at Glanvilles Wootton, on the 26th of May, 1823. There is one in the Linnean cabinet, taken at Maiden Bradley, Wilts, by Lord William Seymour, on a ticket attached to which is written "unknown to Jones."

Geometra tristata.—This insect, which has been taken in Devonshire, by the late Captain Blomer and Mr. Cocks, I captured near Ambleside, in Westmoreland, on the 26th of June, 1827.

Crambus, n. sp.?—A specimen, allied to the *C. pascuellus*, but distinct from it, I took on Parley Heath, in August, 1835, when collecting in company with the Rev. G. T. Rudd; and I find Mr. Raddon has another exactly like it, which he took in Bewdley Forest, Worcestershire, and I observed a fine specimen very nearly allied, in the cabinet of Sir Patrick Walker.

Pterophorus monodactylus.—This I took in June, 1836, near Liver Frome, Dorset, and at Stafford.

Larva fascelina.—Dr. Abbot observes that a specimen of this insect remained in the pupa state thirty-four days, a second twenty-eight days, and a third twenty-seven days.

Larva pudibunda.—I find from Dr. Abbot, also, that he took the larva of this in June, which went into the pupa in July, and produced the moth in October. I once bred one as early as February 19, in the year 1828, and, in the year 1819, as late as June 14.

Eriogaster lanestris.—The late Captain Blomer bred a specimen of this insect, July 15, 1827; whereas its usual times of appearance are February, March, and April. I have observed that the cocoon of this species is so hard that it is extremely difficult to cut, excepting a few days prior to the insect's transformation, when it readily opens at the end where the head of the moth is situated. What causes this difference? I have also observed a very small hole in the cocoon, which is probably for the admission of air.*

Eriogaster populi.—I have bred this insect as early as October; this was in 1821: and in 1831, as late as December 19.

* There was a discussion at the October meeting of the Entomological Society, which bears upon the subject of the escape of moths from the cocoon, when it seemed to be the general opinion that the insect secretes a liquid which acts as a menstruum upon the gum, or silk, which constitutes the cocoon: in fact, it was stated that this liquid has been observed to be ejected by the mouth.—Eds.

Noctua atriplicis.—I possess a specimen taken at Stilton, or at Whittlesea Mere.

DIPTERA.—*Scatophaga scybalaria*.—This insect, which is figured by Curtis, has been taken in the Isle of Man, by the late Captain Blomer, and in Ireland, by Mr. Haliday.

HEMIPTERA.—*Cicada Anglica*.—This insect, which is figured by Curtis, in pl. 392, is considered as synonymous with the *C. hæmatodes* of Linné. The specimen labelled *C. hæmatodes* in the Linnean cabinet is very similar, but has no red on the thorax. On the ticket attached to it is written "*hæmatodes* of the German Naturalists, Br. Clark," but this is somewhat doubtful.

Fulgora Europæa.—This insect is figured by Donovan, who says it was found in Wales, by Hudson and Yeats, but it is now doubted as being British. This was also the case with the *Chrysomela cerealis*, which had formerly been taken by Hudson also, but was likewise doubted; but many specimens have been captured latterly, on Snowdon and other mountains in Wales, thus confirming Hudson's previous discovery: and this being the case, we may certainly expect that the *Fulgora* will come to light.

Naucoris æstivalis.—This insect, I understand, has been taken by Weaver, of Birmingham, in Sutton Park. I have not seen it.

MR. SWAINSON'S REMARKS ON VERNACULAR NOMENCLATURE EXAMINED.

BY CHARLES THOROLD WOOD, ESQ.

Now that nomenclature is receiving, on all sides, that consideration which, till lately, has been so unaccountably denied it, we may expect that ere long some fixed principles will be adopted, by which the path of those who now grope their way in outer darkness may be rendered smooth and easy, and that it will be entirely cleared of those perplexities which are so annoying to the student and the amateur. I propose, in this paper, to examine the objections to improvements in the vernacular nomenclature of birds, as set forth by Mr. Swainson, which, if left unanswered, might have considerable influence in retarding terminological reform.

In an excellent review of *The Classification of Birds*, in the last No. of *The Naturalist*, the reviewer observes, that Mr. Swainson has not been happy in his objections to a reform in nomenclature: and agreeing as I do in this remark, I shall now proceed to prove it. Mr. Swainson prefaces his observations as follows:

"Nomenclature," he observes, "divides itself into two branches, for all animals with which the bulk of mankind are familiar, have two names; one being the scientific, the other the vernacular." Our author's remarks on the first being, for the most part, sound and judicious, I shall pass on to the second, with which Mr. S. does not appear to be so conversant—probably from having paid less attention to them. "Trivial, or vernacular names," says Mr. S., "cannot be said to come within the range of scientific nomenclature, because they are *not intended* for those who study Natural History as a science, but merely for the mass of mankind." Thus, it seems, according to our author, that those who have not the leisure, or the ability, or the inclination to study Natural History as a science, are to be condemned to learn erroneous names and, consequently, to imbibe incorrect ideas: in short, that the benefits of a correct nomenclature are to be confined to the learned few; while the "mass of mankind" are on no account to participate in them! I should rather have said, that correct names were doubly essential to the many, as they have not the means of rectifying the erroneous impressions that must unavoidably result from them. "Vernacular names vary," continues Mr. S., "in different periods, and not only in every language, but in every province. To attempt, therefore, to have a uniform standard of the *English* names of birds, is as hopeless, as we venture to think it would be useless." To say that *because* erroneous names are now in common use, *therefore* it is hopeless that we shall ever be able to supplant them by correct appellations, is surely not very reasonable: as well might we say, that, because many errors prevail, it is unlikely that they will ever give way to truth. That a reform would be "useless" is Mr. Swainson's opinion: I shall now proceed to examine how far he has succeeded in proving this.

"First," he states, "there can be no doubt that vulgar errors in the naming of birds are very general. The Goatsucker (*Caprimulgus*) does not suck Goats; the Hedge Sparrow (*Accentor*) is not a real Sparrow; the Tit-mouse (*Parus*) is a bird, and no quadruped; the Tit Lark is a Warbler; the Long-tailed *Mag* is no Mag Pye; and in this manner we might object, and reasonably, to one-third of the English names now in use." It is well known that most of our commoner British species have, as has been remarked of the Common Dipper, "as many names as would suffice for a tolerably well-stocked aviary;" and this is the case with each of the birds above-mentioned. Among this multiplicity, it would be strange indeed, if not one good appellation could be found: but instead of seeking for the most appropriate, our author has here, in every instance, singled out the *worst*, on which plan we might not only object to *one* third, but also to *three* thirds of the English names. The *Caprimulgus Europæus* of Linneus, being known by the name *Nightjar* in one part of Britain, and by that of *Goatsucker* in another, surely we may be allowed to select the appropriate one and reject the other, even supposing that it was wrong to *coin* an appropriate name. There are many parts of Britain in which the name Goatsucker is not

only never used, but also where it is entirely unknown: why, then, should we persist in attempting to diffuse a name conveying an idea which we ourselves allow to be erroneous?

The same remarks will apply to the other names. Thus, in my intercourse with the peasantry, I have found the appropriate name, Dunnoc, to be quite as common as the erroneous one Hedge Sparrow: indeed, I am quite surprised Mr. Swainson should advocate the latter, which has long ago been abandoned by all writers on the British Fauna. Tit-mouse is, also, generally abandoned in all our works, from the magnificent production of Gould on *The Birds of Europe*, to Miss Taylor's little volume, *The Boy and the Birds*. From what quarter Mr. S. obtained the strange name Longtailed *Mag*, I really cannot tell; but if it is in use in any part of the island, why should our author be at pains to bring into notice obscure names, at the expense of the appropriate names in more general use? I have been accustomed to hear this bird called by the name Longtailed Tit, but as it has lately been removed from the genus Tit, Mr. Blyth has proposed the very appropriate name, Rose Muffin. Mr. S. tells us that the "Tit Lark is a warbler." What does he mean by this? Does he mean to say that it is a songster? or does he intend to denote some particular genus? And if the latter which genus is intended? For the name Warbler has, at various times, been used to denote the Willet (*Silvia*), the Fauvet (*Ficedula*), the Kinglet (*Regulus*), the Whinlin (*Melizophilus*), &c., &c.; but, at all events, Mr. S. is wrong, for the *Anthus pratensis* is in the genus *Pipit*. If Mr. S. makes such mistakes as these with regard to *British* birds, how can his readers rely on his authority as to *foreign* species? "Some few of these," continues Mr. S., "in systematic works upon our native Ornithology, where the most expressive English names are inserted, may be altered. The Goatsucker may be called the *Nightjar*; the Hedge Sparrow, *Flitwing*, which will be rather better than *Shufflewing*; and so on." There is, however, no "*alteration*" in writing *Nightjar*, instead of *Goatsucker*; this is merely a *choice* between two names equally well known; but as these names are only intended for the "mass of mankind," it is of course of little importance which we adopt; indeed it may be doubted whether the erroneous name is not to be preferred! With regard to the *Accentor modularis*, why should Mr. S. be at the pains to invent a new name, when there is one quite unobjectionable in common use? I shall not pretend to answer this question; but at all events I may assert that his proposing the new name, *Flitwing*, would have the effect of frightening those averse to innovations, which the adoption of Dunnoc would not.

The next sentence is founded on the erroneous idea that the new names can be disseminated in a day or a week, and I shall therefore pass it over, with the remark that the reformed nomenclature must first be adopted by authors, and all the rest will follow easily; especially as the taste for works on Natural History is yearly

becoming stronger. Mr. Swainson continues—"Admitting that appropriate English names should be used, who is to invent them?" I answer that there would be but little need for exerting the inventive faculties; for, as I said before, there are very few European or American* birds which have not at least one good name. "Once attempt to destroy the received nomenclature," observes Mr. S., "and every field naturalist, every tyro of Ornithology will contend for the name he likes best. The Longtailed Tit, for instance, has the following names by which it is known in different counties:—Huckmuck, Bottle Tom, Longtailed Mag, Longtailed Capon, and Mumruffin. The Yellow *Wren*, which in fact is not a *Wren*, but a *Silvia* (*Silvia melodia*), is called also Willow Wren, Ground Wren, and Ground Huckmuck. A choice must be made from these, and by whom?" Nothing is more easy than to *make* difficulties, and allege them in excuse of our refusing to do that which we know would be *right*, though are *unwilling* to perform. But true greatness is shown by *overcoming*, and not by giving way to, difficulties. With regard to the Longtailed Tit, I do not see why we should trouble ourselves by trying to displace that established name, unless indeed we agree to remove it to a new genus, in which case Muffin is at hand, without there being any necessity for raking up unheard of names from every corner of the island. If it were necessary to do this, a volume might soon be filled with such names as Captain, Proud-tailor, &c. &c., which are in use in different parts. With regard to the *Silvia melodia*, "Song Willet" is the most appropriate name I have heard applied to it, and Sibilous Willet for the *Silvia sibilans*. The name Wren belongs to *Anorthura*, of which there are only two European species. "Whatever reforms, therefore," continues Mr. S., "which experienced amateurs will admit, must be few and judicious, giving in general the generic or family name to the species; calling, for instance, all the ordinary species of the *Silviadæ*, Warblers; except, indeed, those few groups which are already distinguished by a separate vernacular name, as the Redstarts, Wagtails, Robins, and Chats." Wheatear, Reedling, Nightingale, Tit, Muffin, Dunno, and Pipit, he might and *should* have added, so that of the fourteen genera of the Willet family described by Selby in his *British Ornithology*, *eleven* are popularly known by distinctive names, and of the ten British genera in the Finch family, *nine* are popularly known by distinctive names. The fourteen genera in the Duck family are in that work described under as many vernacular generic names, and I might multiply instances to the end of the chapter, were it necessary: every one of course has the *Feathered Tribes* and the *British Ornithology*, and those works will bear out my assertions. It thus appears that Mr. Swainson's plan—not the one he opposes—would be productive of most alteration if carried through-

* It must be understood that I use the term America in the same sense as Audubon, namely, for the Continent to the north of the Isthmus of Panama; calling the southern Continent Columbia.

out. That able zoologist lays it down as a rule that, "if a principle is good, its advantages will be more and more apparent the more it is followed in detail." Suppose we test this principle by his own rule: we should then call the Blue Tit, Blue Warbler; the Grey Wagtail, Grey Warbler; the Rock Dunlin, Rock Snipe; the Mute Swan, Mute Duck; and so on throughout.

"The *Silvia regulus*," continues Mr. Swainson, "being at the head of this family, should, more especially, be termed a Warbler, *par excellence*; that is, if the same rule is to guide us both in scientific and in vernacular nomenclature. By this plan some sort of connection will be pointed out between the modern subgenera; and we shall not have two birds, actually belonging to the same genus, (like the Yellow and the Goldcrested Warblers), known by two names which have no apparent relation to each other." The first proposition is founded on an erroneous basis; and as the error seems to be very prevalent, it may be as well briefly to expose it. Mr. S. here pronounces the genus *Regulus* to be the typical group of the *Silviadæ* (Willet family), and, in accordance with this idea, he says, that the name *Silvia* should be taken from the Willets (of which there are three British species) and given to the Kinglets, which he would thus deprive of their established name, as, also, he would the Willets, thus creating a double confusion. This is bad enough already; but the plan carries yet other evils in its train; for other naturalists, dissenting from the opinion of Mr. S., may single out another genus as typical. This is actually the case, for Mr. Blyth maintains the Fauvets (*Ficedula*) to be the type of the family; and he, following out Mr. Swainson's plan, would wrest the name *Silvia* from the unhappy Kinglets, which would thus, like other crowned heads, be deprived of their name as soon as they got it. There would yet be a third class, who would contend, with Selby, that the Willets are the true types of the family, (which I take to be the real state of the case), and thus, in one family, there would be continual confusion. And again, suppose some new genus were discovered, which Swainson himself should pronounce to be the type, he would be obliged to re-take the name *Silvia* from the Kinglets, to which he would then restore the old name! I have touched on this subject before; but as it is still in as full force as ever, I have thought it my duty to treat of it more in detail. I have now given my own opinion, fortified by reason; but I can also bring the authority of Mr. Swainson into the field, and turn his own weapons against himself. In that gentleman's work, *On the Classification of Quadrupeds*, he says, at page 378:—"We should gladly have retained the name of *Capridæ* (Goat family) to this group, had we not ascertained that the Goats were an *aberrant*, and not a *typical* genus; these latter groups always giving their name to the family." The family here spoken of Mr. S. calls the "Antelope family, (*Antilopidæ*)."
Now this is precisely what I argue for. If the Kinglets are typical, I would call the family the Kinglet family (*Regulidæ*); if the Fauvets, the Fauvet family (*Ficedulidæ*); and so on. In another part, Mr. S.

tells us that the name *Todidæ* should give way to *Muscicapidæ*, because the genus *Muscicapa*, and not *Todius*, is typical: then why not be consistent, and act on this principle throughout?

Having thus considered the first proposition, let us scrutinize the second. The *Silvia melodia* and the *Regulus auricapillus*, he tells us, "belong to the same genus." This would lead most naturalists to imagine that Swainson adopted the genera of the old school, which is far from being the case. Either from an affectation of singularity, or from some other unexplained cause, Mr. S. does not use the term, genus, in its usual and proper signification, viz., the lowest groups of species; these he calls sub-genera, and applies the name genus to the groups next above these, for which Selby has very judiciously proposed the name *Domus*, and the termination *ites*. The sub-genera disfigure Mr. Swainson's favourite *Northern Zoology*—a work which would have been improved in many respects had it been half the size and a quarter the price. To this work I refer for a practical illustration of the inconvenience of the sub-genus—a name which should be altogether abandoned—and will now continue our examination.

Mr. Swainson next proceeds to consider the theory that each genus should have a vernacular name peculiar to itself: "In regard to the second proposition," he says, "that each genus and sub-genus in general Ornithology should have a distinct vernacular name, the difficulties are of a much more insuperable nature. It would require the coinage of between 300 and 400 English names for birds of whose manners and habits we know little or nothing: and, after all, what possible use would this accomplish? Is it not sufficient, for instance, to designate the five primary groups of the Parrots (Parrot family) by their present well-known names of Maccaws, Parrots, Cocatoos, Lories, and Parakeets, without breaking these up into twenty-five others, which would make ordinary persons lose sight, in fact, of the groups themselves, in a multiplicity of small distinctions which they never could comprehend, and which would only perplex them? But what should we do with the Woodpeckers, (Woodpecker family)—a group of the same value, and therefore containing as great a number of sub-genera as the Parrots (Parrot family)? Five-and-twenty names, at this rate, must be devised for all the variations of a Woodpecker! and they must be appropriate, for otherwise what is their use?" Mr. S. here takes great pains to refute and show the insuperable difficulties of a proposition of his own making: for, as far as I am aware, he is the first who has proposed to give an English name to every known genus of birds. This would be a very useless scheme; for the majority of these genera are known only to a few scientific ornithologists, and perhaps known only to them as dried skins; whereas, English names are not intended for the scientific few, but for the unscientific many—or, in Mr. Swainson's phrase, for the mass of mankind. Those few genera that *are* known generally, should, of course, be called by their proper English generic and specific names, and the rest, known only to the scientific, will be called

by their Latin names : but in no case should a bird *not* in the genus *Psittacus* be called a Parrot, or *not* in *Lorius* be called a Lory. As the English language extends into all parts of the globe, English names for each of the genera will spring up naturally. It has been calculated that, within a century from this time, the English language will be the native tongue of upwards of three hundred millions of the human race ; and when the great continent of America, and the vast island of Australia shall be peopled by descendants of the inhabitants of Britain, surely it will be worth while to coin English names for the accommodation of so respectable a majority of the human race.

"It is only," concludes Mr. S., "when we come to follow a theory, whether in science or in common matters, down to its details, and see how it will *work*, that we can judge of its practicability or of its use. Some few vernacular names, indeed, may be occasionally added, but the construction of our language is not well adapted for this purpose. To attempt expunging a well known vulgar name because it does not happen to express a scientific group, appears equally repugnant to common sense and sound judgment." We have seen how Mr. Swainson's theory (namely, giving the English *family* name to all the genera) has stood his own test ; we have assayed it in his own crucible, and have found that what he recommended as gold has turned out to be mere lead : at the same time I fearlessly invite him to try the theory he opposes in the same crucible, and venture to predict that it will come out scathless, even from a furnace seven times heated. I do not understand what Mr. Swainson intends when he speaks of "expunging a well known vulgar name because it does not happen to express a scientific group." Instances should have been given, that all misconception might be avoided. Does he allude to such names as Rook, Kittiwake, and Smew ? If so, I should answer that, as these names do not inform us as to the genus to which each respectively belongs, they are necessarily imperfect, and this imperfection might either be avoided by adding the name of the genus, as Rook Crow, Kittiwake Gull, and Smew Merganser, or else descriptive specific names might be substituted, as Barefaced Crow, Gray Gull, Pied Merganser. But, perhaps, he alludes to such names as Gold Finch, Bull Finch, Willow Wren, Tit Mouse, Bank Martin, &c. These names must be either erroneous or correct ; if the former, no unprejudiced person can for a moment hesitate as to whether they should be retained or not, but if the latter, there is no need to discuss them. A person ignorant of Natural History would suppose that the above named birds belong to the genera Siskin (*Carduelis*), Alp or Coalhood (*Pyrrula*), Willet (*Silvia*), Mouse (*Mus*), and Martin (*Martes*) ; and in every instance he would be wrong. Can such a nomenclature be desirable ? or, rather, does it not defeat the end for which nomenclature was formed ? Yes ; and on this account I should recommend all who have the interests of the "mass of mankind" in view to avoid all such names as worse than useless.

I have now, sentence by sentence, shewn the unsoundness of Mr. Swainson's views. That it is *practicable* to carry into execution the plans here advocated may be seen by referring to Number XIV. of that valuable periodical *The Analyst*, and that it is *desirable* to do so I think I have already, in some measure, shewn, and shall, in all probability, do so more fully when I reply to Mr. Morris. That a writer of such true depth, masterly precision, and admirable talent as Mr. Swainson should have so signally failed when he turned aside from the straight and narrow path which leads to truth, is a source of real gratification to those who are anxious for the universal substitution of truth for error ; and though the latter may sometimes prevail for a time, like the murky cloud of a summer's day, yet equally transient will be its triumph.

A BOTANICAL TOUR IN HEREFORDSHIRE, MONMOUTHSHIRE, AND SOUTH WALES ;

WITH INCIDENTAL NOTICES OF THE SCENERY, ANTIQUITIES, &c.

BY EDWIN LEES, F.L.S. AND F.E.S.L.

(Continued from page 217).

THERE are two enemies particularly annoying to the practical botanist in his explorations. The first of these is the road-surveyor—maledictions on his head !—who, galloping along on his well-appointed steed, and thoughtfully pausing here and there, has already, in idea, cut through one hill, avoided another, gained a yard in one place, and overcome an angle in another, till the old winding, spreading, sheltered, high-banked way, with its terraced footpath bordered by “Robin-run-i’-he-hedge,” “Houndstongue,” “Five-fingered grass,” “Soapwort,” and many an old remembered favourite, can be no longer recognized in the long, dull, mathematical macadamization that has been just laid down according to modern rule, and where no plant but the “cursed Thistle” is likely to vegetate for many a long year.* For not only is the pedestrian brought down from his high but safe

* This is no fancied picture, since I can enumerate at least three remarkable plants which have all disappeared from the vicinity of Worcester within the last few years, occasioned by alterations and improvements on and about the roads. The first is the *Cynoglossum sylvaticum*, recorded by Dr. Nash as met with near “the third milestone on the Per-shore road,” but now not to be seen within many miles of the spot. The second is *Anthriscus cerefolium*, mentioned by Dr. Stokes as growing, in 1775, in great profusion, just beyond

eminence to a level with every mud-splasher who wilfully dashes along on the very verge of the path, but every green oasis that formerly gladdened the eye is hedged off—every gate, surmounted with a formidable *chevaux-de-frize*, frowns upon the hopeful eye—

“Even the bare-worn common is denied”—

and not a stile remains to offer a meditative lounge, which must now be sought, if at all, within those hallowed recesses where, thanks to legislative wisdom, you perceive you are “*Licensed to be drunk on the premises !*”

But “what’s the use of sighing?” I can have no hope to soften or macadamize the heart of the obdurate road-surveyor. But there is another enemy that I may hope to touch, and that is the botanist himself. Whoever has sought for the rarer plants, as I have done, in the habitats mentioned in “the books,” must have often with me have felt the pang of disappointment at finding no traces of the species in the designated localities; and so much did this feeling operate upon the late Mr. Purton that, in his *Midland Flora*, he declared that no plants should appear unless observed by himself or some living authority he could depend upon. But the rapacity of even living collectors is unfortunately proverbial, and it often defeats itself. I have known young enthusiastic botanists, on being taken to the locality of a rare plant, rashly root up every one that could be found; so that either the species in question was actually eradicated there, or at any rate the habitat became “unproductive” for some years to come. There was much good sense in the country dame I have heard of who incessantly and invariably aimed to impress upon all about her the maxim “always keep an egg in the nest:” and this is equally applicable to botanical as to pecuniary affairs. If a rare plant, when found, is indiscriminately gathered, without “leaving an egg in the nest,” not only is the next botanist who may come to the spot disappointed, but it may be even imagined, and not altogether unjustly, that the plant in question was never really met with there, while even charity herself is compelled to suggest that “some mistake” must have arisen. Hence my invariable custom is, where more than one plant presents itself, to “leave an egg in the nest;” and I recommend this principle to my brother botanists. Of course, where specimens abound there can be no harm in “making hay while the sun shines;” and I shall now, therefore, without further circumlocution, proceed to my herborizing avocations.

Abergavenny is a good central position to radiate from into the surrounding

the turnpike on the Tewkesbury road; here I observed it for several successive years, till, in 1830, the fiat went forth, the road was widened and altered, and the plant lost. I have now in my *herbarium* a specimen of *Verbascum virgatum* which I gathered in 1828, growing by the side of the Kidderminster road, about two miles from Worcester; I again noticed it the following year, but the strictest search since has been unable to detect it.

districts, tempting alike to the botanist and the lover of picturesque scenery. The sparkling Usk rolls beneath its double bridge, glances on its cumbrous ruined castle seated on a green elevated mound, and, ploughing into the gravel on its pebbly shores, hastens along its beauteous vale to the ocean. Bounding the valley on the west rises the stupendous Bloreng Mountain to the height of 1720 feet, the termination in this direction of that band of mountain limestone that encompasses the South Wales coal-field; clouds ever and anon wreath its summit, while the morning sun lights up the woods at its base, its green sides, and its protruding rocks, leaving the vast punch-bowl hollows of the mountain shadowed in gloomy obscurity. Northward the pyramidal height of the Sugar Loaf and its massive subject buttresses of old red sandstone block up the vale, leaving but a scanty space for the passage of the Usk on the one hand, and shelving off on the other towards the isolated fortress of the Skirrid Vawr, whose terraced ridges and detached promontories form a commanding object eastward; while from thence to the south an undulating woody ridge, capped by the feathery Little Skirrid, extends almost to the very banks of the river.

“ The lucid Usk, the undulating line
That nature loves; whether with gentle bend
She slopes the vale, or lifts the gradual hill,
Winds the free rivulet, or down the bank
Spreads the wild wood’s luxuriant growth, or breaks
With interrupting heights the even bound
Of the out-stretched horizon.”*

To increase the charm of the scene, the foaming little river Gavenny, to which the town owes its name, rushes from the eminences eastward through richly verdant meadows to increase the liquid resources of the Usk at this place. The beauties of the country around, Crickhowell only six miles northward, Ragland’s noted towers eight miles to the south, with the matchless arches of Tintern within the range of a more distant excursion, conspire to tempt the pausing footsteps of the tourist at Abergavenny; but, anxious to press forward while all was bright and gay overhead, I determined to encamp here on my return for a short time. I, therefore, took measures for proceeding to Newport as soon as breakfast was dispatched, and meantime met the first rays of the saffron morn on the dewy banks of the Gavenny and the Usk.

Sambucus ebulus, the Dwarf Elder, I noticed by a spring on the road towards Skenfreth, and observed it in considerable plenty in a hedge not far from the foot of the Derry.

Cotyledon umbilicus appeared in profusion and luxuriance on many old walls in the town and suburbs.

* Sotheby.

Orobanche minor.—On the top of an old garden wall on the road to the little Skirrid, overgrown with Ivy, and in a very rubbishy state.

* *Mentha viridis*.—Plentiful in a watery ditch below the bridge and not far from the Usk.

Rosa arvensis.—In great beauty and abundance, adorning the thickets at the foot of the Derry, and apparently the most common Rose in this vicinity.

* *Salix rosmarinifolia*.—In a marsh overspread with various willows, and overgrown with brambles, reeds, &c., forming a favourite angling haunt for some distance along the Usk, below the castle.

* *S. amygdalina*.—Almond-leaved Willow. In the same shady, secluded spot.

Tussilago farfara.—Most abundant on the shores of the Usk.

In proceeding from Abergavenny to Newport, I could not help remarking the greater exuberance of the Common Elder (*Sambucus nigra*), filling the hedges to an extent I never before noticed in any other county than Monmouthshire, and loading the air with its peculiar scent, while its snowy cymes whitened the country far and wide. It is remarkable, however, that in this country it is never found far removed from the works or habitation of man, and never within woods, unless, perhaps, on the site of some abandoned cottage. This suggests the idea of its not being really indigenous, but introduced into Britain at an early period, and very likely by the Romans, who had no less than five principal stations in Monmouthshire, one of which, Caerleon, was the metropolis of the province termed Britannia Secunda; and here the Roman power and jurisdiction was established for more than three centuries.* Dr. Walker thought the Elder was not indigenous to Scotland, justly observing that there existed no old trees, and the only veteran of any bulk that I ever met with was in the vale of Neath, near the Porth-yr-ogof, or Mellte cavern, which I shall have occasion to mention hereafter. Loudon remarks that “it is frequent in Greece, and was formerly much employed in medicine there, as the space it occupies in the works of Theophrastus bears ample testimony.”† We can scarcely doubt, therefore, that the fame of its virtues preceded it, and ultimately led to its transportation from Greece, through Italy, to England, where hot “Elder wine” is still considered to be no bad renovator on a cold frosty night, if, indeed, the cauterizing potion can make good its passage to the interior—but it requires some effort to do it. The Elder was probably indigenous to Italy, if the account of Pliny is to be depended upon, who says “The shepherds are thoroughly persuaded that the Elder tree growing in a by-place out of the way, and where the crowing of Cocks from any town cannot be heard, makes more shrill pipes and louder trumpets than any other.”‡ Phillips, in his *Companion for the Orchard*, gravely tells us that “Boerhaave, the celebrated physician of Leyden,

* Evans' and Britton's *Monmouthshire*.

† Loudon's *Arboretum and Fruticetum Britannicum*, p. 1029.

‡ Pliny's *Natural History*, translated by Phil. Holland, M.D.

is said to have held this tree in so great veneration that he seldom passed it without taking off his hat and paying reverence to it." The old Dutch doctor must surely have been a determined toper of Elder wine! what else he could see in the Elder to induce him to doff his cocked hat to it seems impossible to conceive. Phillips omits to state his authority for this story, which, if true, was perhaps connected with some superstition, from which the greatest men have been not always exempt.

At Llanellen, four miles from Abergavenny, we crossed the Usk, and in a hedge-row here **Rosa villosa* appeared with its beautiful deep pink blossoms.

Grammitis ceterach shewed itself for the first time in this quarter in the interstices of a wall.

Further on, a gigantic old Ash tree, enveloped with Ivy, formed an interesting spectacle. Passed Mamhilade Church, whose cemetery is wrapt in sombre gloom, by eleven large Yew trees, one of which, near the building, is of very large dimensions. A whimsical idea has been taken up by St. Pierre, and rather strangely propagated by Dr. Johnston in his interesting *Flora of Berwick-upon-Tweed*, that Ivy will not grow upon other evergreens.* The futility of such an hypothesis was here very evident, for many of these Yews were densely clothed with Ivy, as well as numerous Firs in the same vicinity. It must be admitted that a gloomier object than a Yew or Fir cloaked in still darker verdure than its own shadowy robe is hardly conceivable; and I was much struck some years ago with one of this description that I met with canopying, in sombre twilight, a dingle near the Wrekin, where a silent streamlet wept through the lurid shade. In Lower Sapey churchyard, Worcestershire, there is also a singular Yew which the Ivy upon it has completely overpowered, surmounted the very topmost branches, and formed a large ivied canopy upon the summit of the tree. I have noticed Portugal Laurels, also, and various species of *Pinus*, robed in Ivy in Witley Park, Worcestershire, and in numerous other places. These Ivy-enveloped evergreens are not disregarded by the birds, who find them very convenient places for nidification; and they are especial favourites with the Stock Dove, where he coos away unseen and undisturbed.

At Llannihangel, two miles from Pontypool, I was much pleased to notice the custom of planting the graves of the rural inhabitants with flowers—an old observance, still piously kept up at present in South Wales. It is not, perhaps, generally known that plants of pungent scent are chosen for this purpose, in preference to more specious and more elegant flowers. Thus, Rosemary, Balm, Old-man, and Tansy are of most frequent occurrence; the latter of which, and some others, are alluded to by Mason, in his fine elegy commemorative of the practice:

* Johnston's *Flora of Berwick-upon-Tweed*, vol. i., p. 209, under *Pinus sylvestris*.

“ Full many a flower,
Pansy and *Pink*, with languid beauty smile ;
 The *Primrose* opening with the twilight hour,
 And velvet tufts of fragrant *Chamomile*.

For, more intent the smell than sight to please,
 Surviving love selects its vernal race ;
 Plants that with early perfume feed the breeze,
 May best each dank and noxious vapour chase.”

The idea seems to be, to render the last sad home of the departed in the cold ground as pleasing as possible, by throwing around it a grateful perfume ; and perhaps this may have originally arisen from sanitary motives, the putrid effluvia from the mortal remains being thus neutralized by the agency of the plants, no danger need be feared from a silent communion with the loved object now for ever at rest. A somewhat similar idea seems to have been entertained by Shakespeare, when, in reference to the death of Fidele, he exclaims—

“ With fairest flowers, while summer lasts,
 I'll *sweeten* thy sad grave.”

When the *Pink* is extensively employed for this purpose, as here and in Cad-oxton church-yard, near Neath, the most beautiful, as well as elegant, effect is produced. The Rosemary bushes are but gloomy, unsightly objects, and the rank Tansy (*Tanacetum vulgare*), however beautiful when in its proper place by the river side, adorning the bank with its golden flowers, is here no better than a weed, and sadly out of place. A distinction is to be made between planting the graves with herbs, and strewing them with flowers—the latter only taking place immediately after interment, and being continued only at intervals, till the growing plants put forth their blossoms. One of the most charming spectacles of this kind that I ever saw, was in the church-yard of Trevethin, near Pontypool, in the month of March some years ago, where several children were diligently employed in decorating every grave with the brilliant flowers of the Daffodil, “that comes before the Swallow dares.” These, covered with dew-drops, and glistening in the morning rays of a vernal sun, produced a very brilliant effect. That this highly poetical custom has been handed down from antiquity, and was practised by the Romans and Romanized Britons in these very parts, no doubt whatever can exist. When Martyn, in his notes to the 5th eclogue of Virgil, under the words “*Spar-gite humum foliis*,” says, that “it was a custom among the ancients to scatter leaves and flowers on the ground, in honour of eminent persons, and some traces of this custom remain among us at present,” he doubtless alludes to the subject under consideration, as *the ground was to be spread with leaves* in honour of

Daphnis, and a monument raised to his memory. This original heathen custom was found not inappropriate to christianity, and is alluded to by several of the fathers, though St. Ambrose seems to imply a disregard to, or disinclination for, the practice. “*I will not,*” he says in his funeral oration on Valentinian, “*sprinkle his grave with flowers,* but pour on his spirit the odour of Christ; *let others scatter baskets of flowers.* Christ is our Lily; with this I will consecrate his relics.” One curious circumstance struck me in this church-yard, which, whether accidental or the work of art, affected me considerably. A wild Rose bush (*R. canina*) had taken its position, as an epiphyte, upon the sole Yew in the cemetery, from whence its pink flowers depended in long waving tresses in beautiful profusion. It seemed to me an emblem of struggling genius and virtue, surmounting the most unfavourable circumstances, and flourishing in despite of the baleful and poisonous influence of the envy and malice that hoped to overshadow and destroy it. Or it might be considered emblematical of those unexpected joys which often irradiate the horizon of life when only clouds seem rolling around; or here, in particular, it might symbolize the delightful hours we once enjoyed in the company of those endeared to our hearts, and embalmed in our recollections; but whom we can never again engage in delightful association till the mournful Yew has waved its branches over us. Such thoughts and reminiscences of departed joys are truly, indeed, like the fragrant Rose flowering upon the dark Yew.

“ Long, long be my heart with such memories fill’d,
Like the vase in which *Roses* have once been distill’d;
You may break, you may ruin, the vase if you will—
But the *scent of the roses* will hang round it still.”

The dark, dirty, and uninviting town of Pontypool, next presented itself to view, where there is nothing to attract a naturalist, unless he pursues his course to the hills and mountains beyond, which was not now my intention. The torrent that brawls along its stony bed at this place, bears the name of the Avon Lwid, or *Grey river*, from the circumstance of its waters, in rainy weather, pouring down in a *milk-white* flood. This is rather a curious fact, and arises, as I had formerly an opportunity of observing, from the soft breccia composing the hills from which the springs forming the river arise. The waters pouring down the declivities, disintegrate the soft white sandstone, which contains the quartzose and jasperian pebbles as in a cement, and become so loaded with the comminuted arenarian matter, that they appear like streams of milk murmuring amid the green moss and rising copse-wood, till they mingle together amid masses of ironstone to form the foaming “*Grey River.*”

Nothing of any interest occurred between Pontypool and Newport, which latter town we entered by a massive stone bridge across the Usk. The church stands on an eminence out of the town, with some fine Ash trees within its pre-

cincts, and commands a splendid view of the Bristol Channel, the Flat and Steep Holmes, and the opposite coast of Somerset. While waiting for the arrival of the mail to proceed to Swansea, I investigated the environs of the town, which proved, however, rather unproductive.

* *Enanthe crocata*? I perceived in some quantity in flower, overspreading a marshy spot in a field by the side of the Cardiff road. I afterwards noticed this plant in several other parts of South Wales, where it appears to grow profusely. Since Sir W. J. Hooker introduced the *Æ. apiifolia* of Professor Brotero into the British Flora, from the information of Mr. Banks, of Plymouth, this "Celery-leaved Water Drop-wort" has found its way into six counties, but I cannot help suspecting that here a distinction has been introduced "without a difference." Botanists had taken up a notion (how true I am unable to say) that *Æ. crocata* always abounded in a yellow juice. Hence Mr. Banks, finding a similar plant with "no peculiar juices," is induced to consider it a new species, entirely on that account. Now, certainly, if the existence or non-existence of the supposed "yellow fetid juice" makes the plant before us either *Æ. crocata* or *Æ. apiifolia*, why then my plant is the latter. But the question arises whether this "poisonous yellow juice" is constant in *Æ. crocata*, or whether it really appears at all? I have met with the plants abundantly on the banks of the Teme, Worcestershire, and, though frequently gathering it, never verified the emission of the "orange-coloured, fetid, very poisonous juice," which, according to Sir J. E. Smith, ought to exude from "all parts of the herb when wounded." It is remarkable that Sir W. J. Hooker merely observes "full, *it is said*, of a poisonous yellow juice," and introduces *Æ. apiifolia* "with some hesitation." I cannot conceive the two plants to be essentially different, especially in the absence of any recent witnesses of the emission of yellow fetid juice from the *Æ. crocata*, which very probably, if it appear at all, is only at peculiar seasons, or in very variable quantities. Dr. Woodville, in his account of *Æ. crocata* in the *Medical Botany*,* says not a word about yellow juice, though anxious to warn his readers on account of its poisonous qualities, being by Dr. Poultney "esteemed to be the most deleterious of all the vegetables which this country produces." Brotero's name implies the similarity of his plant to *Celery*, and Woodville states that three French prisoners residing at Pembroke mistook the *Æ. crocata* for *wild celery*, and, presenting it to their comrades, had nearly caused the death of the whole of them, and two actually died from partaking of it. The death of five boys in Ireland from the same circumstance is also recorded. I should fear mischief from the use of the term *apiifolia*, unless it can be satisfactorily shewn that the plant intended is innoxious, and differs in other

* Supplement, quarto edition, p. 143. In the second edition of Withering, under the co-editorship of the late Dr. Stokes, a most acute botanist, the yellow juice of *Æ. crocata* is unnoticed.

particulars from *crocata*, independent of the emission or non-emission of the yellow or orange-coloured juice. Mr. Watson, with the best intentions, here only increases the difficulty by inquiring, in his *Botanist's Guide*, for *apiifolia* only, and leaving out all mention of *crocata*. No light, however, is thrown upon the subject by any of his correspondents, for three set the plant down without any particular habitat, while even the acute Mr. J. E. Bowman puts a query to his "*apiifolia*?" observing "I found what *I take to be this* on the Menai Strait, above Vayrwl, and in a dingle near Beaumaris.* Since penning the above I have received the second edition of Lindley's *Synopsis*, where, in the Supplement, the following remark occurs, coinciding with the views I have taken. "In the *British Flora*, Dr. Hooker admits, under the name *Enanthe apiifolia*, of Brotero, a plant resembling *Æ. crocata*, from which it differs, among other things, in having no yellow poisonous juice: but in the third edition of that work the species is abandoned, upon the ground of such juice not being constantly present in *Æ. crocata* itself. Of course, it will not constantly be present in that plant more than in any thing else, inasmuch as the presence of such secretions depend upon seasons and other circumstances; but from what has been said about the supposed *Æ. apiifolia*, we recommend that plant to a new and more diligent investigation: it is said to grow about Plymouth."

On several *Rumices*, growing by the side of the rail-road, I noticed the Dock *Æcidium* (*Æ. rubellum*, Pers.) in great plenty, displaying its white clustered pseudoperidia in extreme delicacy and beauty. It is not common in fructification in the midland counties, and hence Purton has figured it under the name of *Æ. rumicis*.†

Being anxious to investigate the vicinity of Swansea, I found it expedient to proceed there by mail, which going the whole way to Milford, I found every place but one engaged—that one was unfortunately inside. Little account, therefore, can I give at present of the plants intermediate between Newport and Swansea, except that **Cotyledon umbilicus*, not noticed by Mr. Watson as inhabiting Glamorganshire, appeared very plentiful on almost every rock and wall I could occasionally discern between Cardiff and Briton Ferry. At Cardiff I had an opportunity of walking round the area of the castle, and glancing at its ruined keep; when, as I was about to retire, a porter, in the livery of Lord Bute, would insist upon conducting me into the only lion's den about the place—a square damp dungeon close to the entrance, with a solitary ray of light hardly able to wind its way in through a corner cranny, where he assured me Robert, Duke of Normandy, had been confined for above twenty years! I had forgotten all about Duke Robert, and repented that I had been thus allured by my conductor, and must

* Watson's *New Botanist's Guide to the Localities of the Rarer Plants of Britain*, p. 229.

† Purton, *Midland Flora*, vol. iii., t. 26.

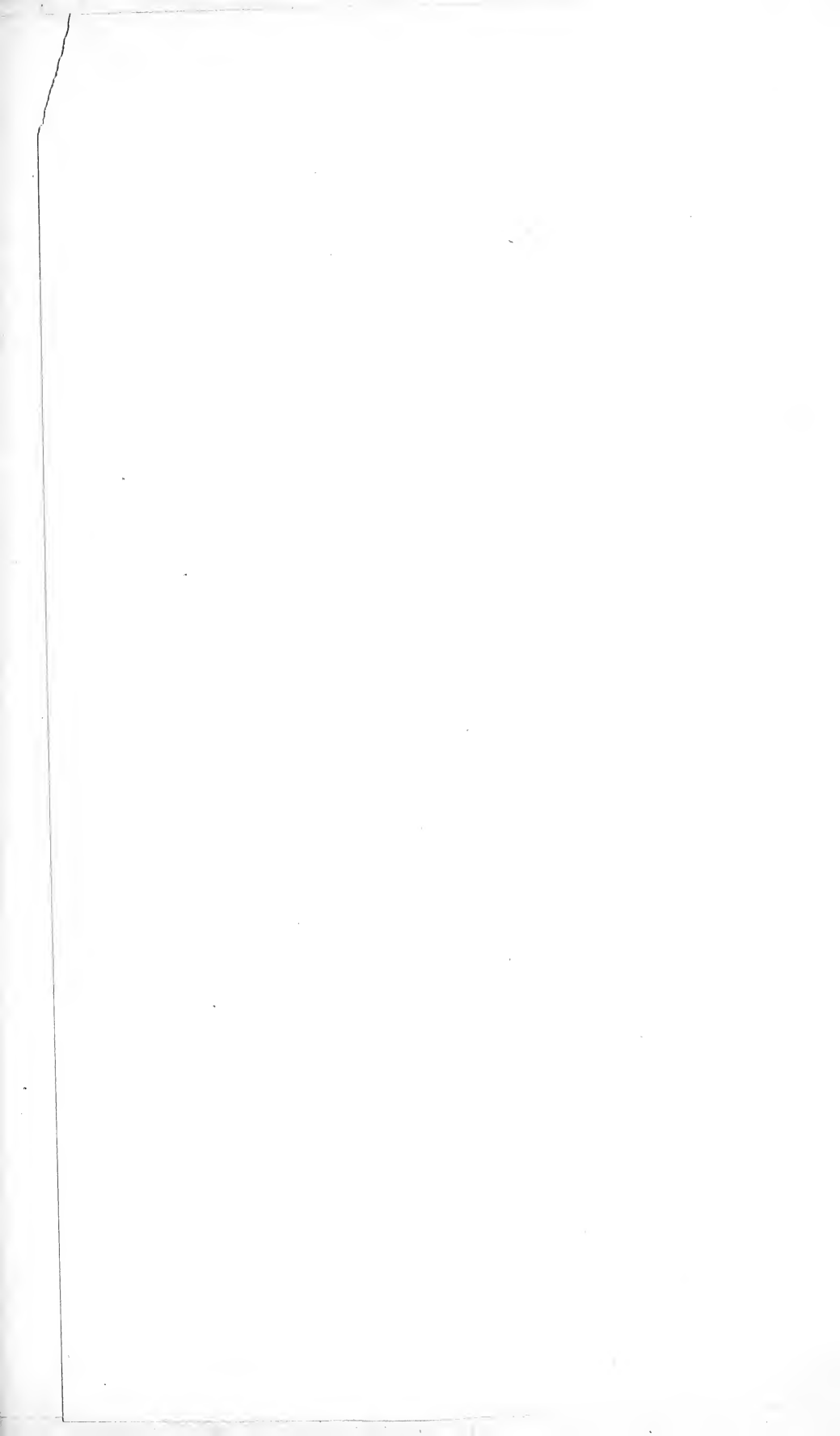


Fig 1.



o section of h.

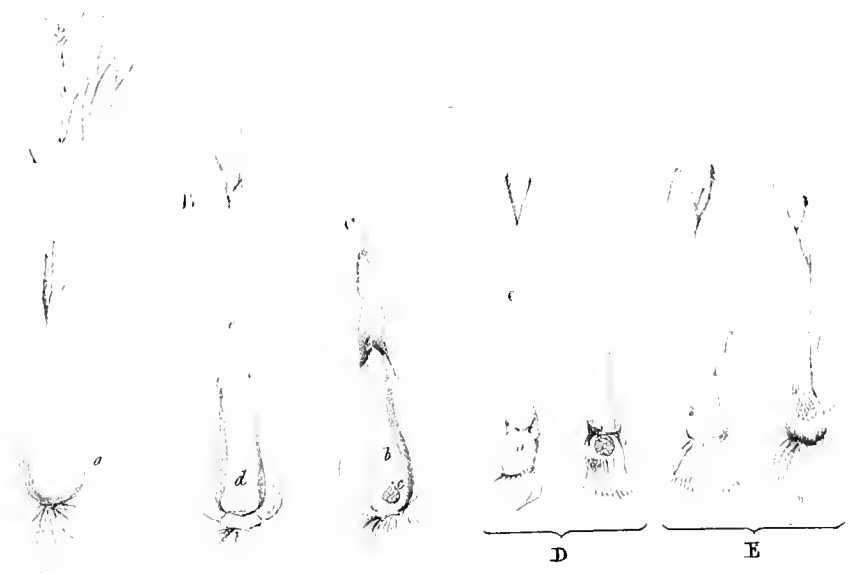


Fig 2.

Fig 3.



h

g

H

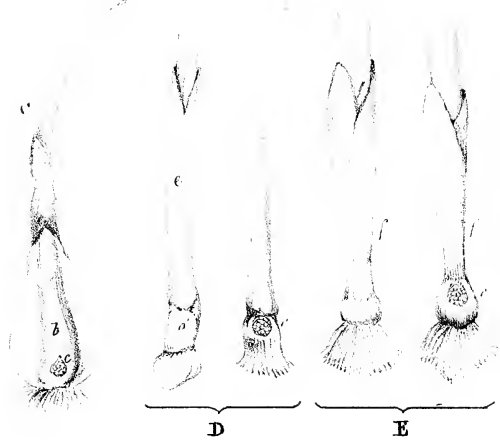


Fig 2.



A



H

surrender the image and superscription of his majesty on such a dismal and wretched pretence as this. If Robert ever had been confined in the dungeon I was ushered into, there was little necessity to put out his eyes, for they would not even have shown him a spider on the wall. I darted hastily off, resumed my seat, and resolved to abandon dungeon explorations, where no sight of plant, no sound of insect, or form of beauty was likely to repay my search.

(To be continued).

ON THE EVIDENCE OF DESIGN OBSERVABLE IN THE VITAL ECONOMY OF THE COLCHICUM AUTUMNALE, (LINN.), OR COMMON MEADOW SAFFRON.*

BY WILLIAM ALLPORT LEIGHTON, ESQ., B.A., F.B.S.E., &c.

The innumerable instances of design, or the adaptation of certain means to a corresponding end, visible in apparently the most insignificant works of nature, merit the attention and claim the admiration of man. In the vegetable world, no less than in other departments of creation, this observation holds in full force, for almost every plant which either displays its beauteous blossoms to gladden and attract the eye, or which merely uprears its minute verdure from the surface of the tempest-riven rock or time-worn ruin, only to lend its aid in forming one of those varied tints which contribute so materially to the picturesque beauty of such situations, will be found, on careful examination, to possess contrivances for the support and reproduction of the particular species which evince the most consummate skill, the most unbounded wisdom.

In the *Colchicum autumnale*, or Meadow Saffron, these provisions are peculiarly worthy our careful attention. This plant is included in the Linnean Class *Hexandria*, and belongs to the Natural Order *Melanthaceæ*; a tribe abounding in a powerfully acrid and poisonous principle, which, under the guidance of experience and judgment, has proved of essential service in medicine. The lower portion of the stem of the *Colchicum autumnale* is swollen into a cormus or solid bulb (see FIG. I, A, a),† and lies deeply buried in the earth, invested by the dried

* Read before the Shropshire and North Wales Natural History and Antiquarian Society, November 1, 1836.

† A, the entire plant as it appears in the autumn—B, the young bulb and stem attached to the parent bulb—C, the parent bulb, (the young bulb being removed), showing the groove and the attaching fibres—D, exterior and interior views of the young plant detach-

and partially decomposed leaves and spathas of preceding years. In a groove (*b*) on one side of this bulb, at a point a little above the life-knot, or part from which the true roots depend, and connected with it by a bundle of horizontal fibres (*c*), is attached a smaller bulb (*d*), which, during the summer months, absorbs its chief nourishment from the parent bulb, gradually swelling and enlarging, and, so soon as the first chilly winds of autumn have breathed over the earth, elongating its summit, and protruding through the soil a long tubular spatha or sheath (*e*), which envelopes the entire bulb, stem, and roots. In this sheath lie two or more perfectly formed flowers, each consisting of an elongated tube crowned with a purple limb of six petals, and also the rudiments of one or two other blossoms. On removing the membranous sheath, we perceive at the base of the floral tube, immediately above the young roots, a few rudimentary leaves (*f*) closely encircling the slightly swollen bulb. On stripping off these leaves, a small bud or germ (*g*), destined to become the bulb of a succeeding year, appears attached to that side of the young bulb which is farthest from the parent bulb of the present year. On entirely removing the leaves, and opening the elongated tube of the flower, we discover that to the three inner divisions of its perianth are attached six stamens (*k*) surrounding three linear stigmas (*i*), whose filaments are continued down the floral tube to its base, where they communicate with a three-celled germen or ovary (*h*) containing the ovules or undeveloped seeds. No sooner have the anthers performed their office of fertilization on the stigmas than the corolla fades, withers, and dies off; the young bulb becomes swollen, its roots burst through their membranous covering, and protrude downwards. Throughout the winter it absorbs, through the lateral attaching fibres, the greater portion of the parent bulb, the surplus of which subsequently decomposes. The nutriment thus stored up remains dormant during the winter months, and until the first warming breezes of spring again stimulate into motion the vital juices, when the hitherto buried germen, protected from frost or accident by its several coats, is pushed upwards to the surface, the fully developed capsule (*l*), surrounded by shining green leaves, displays itself, and, on becoming fully matured, opens its inflated cells (*m*), scattering the seeds over the earth. The leaves also, in their turn,

ed from the parent bulb—*E*, exterior and interior views of the young plant, divested of the spatha, and showing the undeveloped leaves—*F*, exterior and interior views of the young plant, showing the floral tubes, the reserve blossom, and the embryonic germ—*G*, the floral tube opened, showing the positions of the anthers, pistils, &c.—*H*, the pistils divested from the floral tubes, exhibiting their connections with germen and bulb—*I*, the appearance of the plant in the spring.

a, the cornus, or solid bulb—*b*, the groove in which the young plant lies—*c*, the bundle of lateral attaching fibres—*d*, the young bulb—*e*, the spatha—*f*, the young leaves—*g*, the embryonic bulb—*h*, the germen—*i*, the stigmas—*k*, the anthers—*l*, the developed germen—*m*, the fully ripened capsule—*n*, the reserve blossom—*o*, transverse section of the germen, *h*.

now wither away, and the embryo germ or bud is, by a similar process, carried forward to maturity.

In using the term "*solid bulb*," in the above description, I would wish it to be clearly understood that I only avail myself of the common botanical phrase expressive of the peculiar kind of bulb of this and similar plants; for I am fully convinced, by observations which I have recently made, that no such thing as a *solid bulb, strictly speaking*, exists in nature. Every bulb is, in fact, a bud, in which the stem enveloped in the leaves is, like the cylindrical tubes of a closed telescope, depressed into the plane of its axis. The scales or tunics of which *every* bulb consists are, in reality, so many leaves modified and swollen by excess of nutritive matter, and many of them bearing in their axils smaller bulbs, the undeveloped buds of future plants. This is abundantly evident from a mere inspection of the *Crocus* bulb (FIG. 2, A)* usually cited as an example of the solid bulb, but which in reality consists of the base of the stem much swollen, enveloped by a series of swollen and modified leaves closely agglutinated and concentrically overlapping each other (FIG. 2, a), and supporting in their axils a series of embryonic bulbs or buds (FIG. 2, b) spirally arranged. On tracing these concentric leaves throughout the bulb to its summit, it will be found that the shoot or shoots (FIG. 2, c) destined to produce flowers, &c., in the present year, are one or more of these embryonic bulbs more highly developed than the rest. In these shoots, also, the same concentric arrangement of the leaves will be found to exist. The bulb of the *Colchicum autumnale* (FIG. 3),† usually adduced as another instance of this form of bulb, is of a similar construction, though at first view very different. The stem in this case is excessively and immoderately swollen, the enveloping leaves so firmly agglutinated as to be only distinguishable in a thickened scale or protrusion (FIG. 3, a) immediately below the young bulb (FIG. 3, b), which maintains its proper place in the axil; and in those instances in which a second embryonic bulb occurs, this is invariably in such a situation that a line drawn from the first embryonic bulb to it will form a portion of a spiral. This, in short, is the mode of growth we might naturally expect in these plants, belonging as they do to the great natural class of Monocotyledons—a growth perfectly analogous, although performed in a shorter period, to that of the Palms, and other tropical tribes of this class.

The benevolent Paley adduces the unusual periods of the autumnal flowering and vernal ripening of the seeds of the *Colchicum autumnale*, as an apt illustration of his doctrine of compensation. No apology may be deemed necessary for repeating his exquisite and well-remembered words:—"I have pitied," he says,

* A, bulb of the *Crocus*—a, the leaves swollen into concentric scales—b, the embryonic bulbs in the axils of the leaves—c, the embryonic bulbs developed into flowering shoots.

† A, bulb of the *Colchicum*—a, the leaves swollen into thickened scales or protrusions—b, the young bulbs and stems in the axils of the leaves.

"this poor plant a thousand times. Its blossom rises out of the ground in the most forlorn condition possible ; without a sheath, a fence, a calyx, or even a leaf to protect it ; and that not in spring, not to be visited by summer suns, but under all the disadvantages of the declining year. When we come, however, to look more closely into the structure of this plant, we find that, instead of its being neglected, nature has gone out of her course to provide for its security, and to make up to it for all its defects. The seed-vessel, which in other plants is situated within the cup of the flower, or just beneath it, in this plant lies ten or twelve inches under ground within the bulbous root. The tube of the flower, which is seldom more than a few tenths of an inch long, in this plant extends down to the root. The styles always reach the seed-vessel ; but it is in this, by an elongation unknown to any other plant. All these singularities contribute to one end. In the autumn nothing is done above ground but the business of impregnation. The maturation of the impregnated seed, which in other plants proceeds within a capsule, exposed together with the rest of the flower to the open air, is here carried on, and during the whole winter within the heart of the earth. Seeds, though perfected, would be unable to vegetate at this depth in the earth. A second admirable provision is therefore made to raise them above the surface ; the germ grows up in the spring, upon a fruit stalk, accompanied with leaves. The seeds now, in common with those of other plants, have the benefit of the summer, and are sown upon the surface."

From the outline here exhibited of the vital economy and peculiar structure of this plant, it is conceived, that, without overstraining the subject, the argument may be carried some steps further, and that we may reasonably infer that there is design in the mode of its flowering ; in the provision made for its reproduction, in case of the germen remaining unfertilized ; and also, in the relative position of the embryonic germ or bulb.

First.—There is evidence of design in the mode of flowering. The delicate flowers expanding their petals, as the harbingers of winter, without the protection of leaves or other envelope, exposed to the ungenial influence of a changeful season, when scarcely any other plant ventures to blossom, run many risks of being prevented from attaining their destined end, either from the nipping keenness of early frosts, the rude and crushing tread of cattle feeding on the pasturage in which they grow, or the playful and innocent wantonness of heedless childhood cropping the showy blossoms to deck their baby-toys. Nature here, therefore, steps in and provides a remedy. For, unlike most other plants, this does not expand all its blossoms at the same time, but reserves, as it were, a portion, to be resorted to only in cases of necessity. Should injury overtake it in its prime of beauty, a second flower is provided, which, supplied with nutriment from the parent-bulb, is pushed forward and takes the place of its unfortunate predecessor. Should this also be destroyed, a third floret (FIG. 1, *n*) is often visible at the base of the other two,

which, absorbing the requisite nutriment, becomes developed, expands its petals to the genial though feeble sunshine, and thus, at length, effects the fertilization of the ovules.

Secondly.—There is evidence of design manifested in the provision made for the continuance of the individual. Should it so happen that all the blossoms were successively cut off, and the very existence of the plant apparently threatened with destruction, that Beneficent Power, whose fiat first called it into existence, here diminishes not his protecting care. The nutriment, destined for the complete development and perfection of the inflorescence and germen, being no longer wanted for those purposes, is diverted to the enlargement of the young bulb of the present year, on which, safely cradled amid the tender leaves, reposes the embryonic germ, (*g*), which in its turn, also receives the invigorating influences of its parent, and in due time proceeds to its destination.

Lastly.—There is full evidence of design in the relative positions of this embryonic germ and the parent bulb. As before shown, this germ always appears on the side of the bulb of the present year, which is farthest removed from the parent bulb. It is a well-known fact, (no matter as regards our present argument, whether attributable to exhaustion, excretion, or any other cause,) that the soil in which any particular plant has vegetated, becomes less adapted for the immediately subsequent growth of other individuals of the same species. Now, had the embryo bulb been attached to the side *next* the parent bulb, there is a probability that it would either have entirely perished, or, at all events, have become of a weak and sickly habit, in consequence of the inability of vegetating in a suitable and unexhausted soil, or from having its vital powers destroyed or impaired by the heat necessarily evolved during the decomposition of the parent-bulb. And this, in fact, really does take place, for in some strong bulbs which have been examined, a second embryonic germ occasionally occurs on the side in immediate contact with the parent bulb, as well as one on the opposite side. This, however, so far as has been observed, is seldom or never developed beyond the first stage of growth; the vital activity being in all probability checked by one or other of the causes above assigned.

These are no visionary speculations, but plain and simple facts, clear and demonstrable to all. They are in themselves eloquent: they require no index to point out to us that “Great Workmaster” to whom they would lead our thoughts; nor need they, it is humbly hoped, any stimulus to excite in our hearts feelings of gratitude and adoration.

* This must, however, be understood with some latitude; for in very strong bulbs the second embryonic bulb does often become fully developed: but in this case its position will be found to be, not in immediate contact with the parent bulb, but rather on one side.

ST. JAMES'S ORNITHOLOGICAL SOCIETY.

WE have received a prospectus of this society, the object of which is stated to be the "forming a collection of water-birds in the garden of St. James's Park ; and its operations will subsequently be extended to other parks, if the funds of the society be found sufficient." As naturalists, every project of this nature has our sincere wishes for its success, and perhaps, as the moderate subscription of one pound is all that is required, some of our readers may be pleased to take the opportunity of assisting an institution which will doubtless afford facilities for "observations upon the variations and periodical change of plumage, which are so interesting to naturalists." The names of Yarrell, Swainson, Mudie, and Jesse, so well known in the scientific world, are a pledge that some useful purpose is designed by, and will be obtained from, the "Ornithological Society." But if purposes of show only were intended we should still advocate the plan as a probable means of raising the standard of taste among the lower orders in London, who may now, perhaps, for the first time observe the members of the feathered tribes without the mischievous wish to pelt them being gratified. Much has been done by the present age in this respect, and all we want is to see the principle carried out to its fullest extent, so that animals may be seen, admired, and examined, without the insane wish to bait, torture, or injure them. The birds in St. James's Park will have this advantage, that they will be "open to the view of all classes of the people" every day, and thus even the poor mechanic and his family, shut out from light and almost hope for a dreary week, may, in the intervals of public worship on Sundays, solace their eyes with a sight which no philanthropist would wish them to be deprived of. Living specimens, we perceive, of any of the rarer swans, geese, ducks, divers, grebes, waders, &c., will be very acceptable to the society, to whom we can only say "Go on and prosper."

R E V I E W .

Sacred Philosophy of the Seasons ; illustrating the Perfections of God in the Phenomena of the Year. Part I. : Winter. By the Rev. Henry Duncan, D.D. Edinburgh. 1836.

THE author of this work furnishes a beautiful instance of one who is "not weary in well-doing," but who has been continually "going about doing good." After devoting many years in the earlier part of his life to ensure to the poorer classes of his countrymen the benefits of habits of prudence and economy, by

means of Saving Banks, he now comes forward to confer upon the minds of his countrymen of every rank a boon of equal, if not greater value. He desires to engender in them a habit of viewing all the natural occurrences of the year as evidences of the being and attributes of an Omnipotent and Benevolent Deity. He wisely coincides in opinion with Dr. Paley, that "if one train of thinking be more desirable than another, it is that which regards the phenomena of Nature with a constant reference to a Supreme Intelligent Author."

It has been well said by an elegant American writer, that "the study of Nature, like the contemplations of religion, is 'for ever rising with the rising mind.' Nature opens to Genius that immense horizon, in which, to the end of time, it may exercise its strength, and at every step behold the boundary receding to a greater distance." But how much greater the pleasures and advantages when the study of Nature and the contemplations of religion are united! To express this, we must call in the aid of the poet:—

"There is a lofty thrilling joy—
The bounded powers of speech it spurns—
Which lightens in the raptured eye,
And in the swelling bosom burns:
'Tis that ineffable delight,
When, like the glorious lord of day,
The soul, exulting in its might,
Speeds through the realms of thought away.

"When soaring, limitless, afar,
Wide through the universe it strays,
Till not the feeblest twinkling star
On Night's swart brow escapes its gaze.
But higher far its strong wing soars
In loftier and sublimer flight,
When in rapt trances it adores
The very God of Life and Light!"

Nor is it in connexion with natural religion alone, that the amiable author treats his subject: the bearings of it upon revealed religion are equally pointed out, in a manner as creditable to his liberality of mind as to his piety. The following extract will exemplify our meaning:—

"Would we read the book of Nature aright, and see God in his creation, we must have recourse to the book of Revelation; for these two great volumes, written by the same hand and for a similar purpose, cast a strong light upon each other. As the book of Nature, by the visible impress of Divinity stamped upon it, is fitted to prepare us for the more glorious display of the divine perfections contained in the book of Revelation—so is this latter the truest and safest guide to the profitable perusal of the former. In the Bible, the great productions and

aspects of Nature are always mentioned in connection with the glory of God: they are introduced often in strains of the boldest poetry, to teach the infinite power and goodness of Jehovah. We there find the noblest descriptions of natural objects ever penned; and one great moral runs through them all. Every masterly picture of the grand or the beautiful in Nature is but a delineation of God's wondrous attributes. It is, therefore, a positive duty, sublimely taught us both by precept and example, to cherish a sense of the infinite skill and bounty displayed in the creation. We should associate, with all that attracts the eye by its beauty or excites our admiration by its delicate structure, the liveliest expressions of adoration and gratitude. Every survey of natural scenery, every examination of even the smallest of God's works, should be to us a devotional exercise. To a mind accustomed to consecrate all its perceptions of beauty and design to the inward worship of God, every mountain and field, every leaf and flower, teems with instruction. The lustrous wing of the ephemeral insect, as well as the noblest animal form, affords food for the loftiest admiration. The man of true piety and refined feeling enjoys the beauties of Nature with the keenest relish; for Nature is but a pictured volume, in which he reads the character of the Divinity. Every object that meets his eye—be it vast or minute, simple or complex—suggests the most exalted conceptions of Him

“ Who gives its lustre to an insect's wing,
And wheels his throne upon the rolling worlds.”—pp. 169—170.

In respect to the scientific details, they are gleaned from the best authorities, generally from very recent ones. The Bridgewater Treatises have supplied much of the materials; and, indeed, as far as natural phenomena are concerned, whatever was available for his purpose in these bulky and expensive volumes has, by our author, been brought together and placed within the limits of the purse, as well as the time, of ordinary readers. When completed it will form an excellent epitome of these treatises, and be more in accordance with what we are persuaded was the intention of the noble testator than the plan adopted by those who undertook to give effect to his will. The author says, modestly, “ The most important and animating views of the Creator and His operations, in reference to the seasons, are found scattered through many publications, which it has been the agreeable task of the writer to combine in a new series and render generally accessible. In doing this he has frequently quoted the precise words of the various authors from whom he has borrowed his facts. He has no ambition to acquire fame as an original writer; his more humble, but perhaps not less useful, aim being to instruct and edify those who may not be in possession of many works on Natural Theology, by rendering them acquainted with the discoveries which have been made by others in the most interesting of all sciences.”—Preface, iii.

In a few instances we have noted slight inaccuracies, such as, p. 121, the spadix of the *Arum cordifolium* is stated to exhibit a rise of 250° above the surrounding temperature—a thing obviously impossible. P. 215, the traveller in America after whom the river was named was *Alexander* (not George) McKenzie. P. 107, newly-distilled dew should be newly-*deposited* dew.

In discussing the seeming imperfections in the physical government of the universe, the author has recourse to the doctrine of the philosophic poet, which alone can obtain the acquiescence of reflecting and good men :—

“ ’Tis but a part we see, and not the whole ;”

and still more in the moral

“ All partial evil, universal good.”

“ Nor must we forget that the schemes of the self-existent are not bounded by time but embrace eternity. In the present world, the moral government of God is only begun. That may appear imperfect and disordered of which we only see a part, when, if the whole were displayed and understood, every minute particular, and the united result of the whole, would be found to be the perfection of wisdom.”—p. 105.

We had marked many other passages for quotation which our limits will not permit us to adduce ; we can only quote one, and must content ourselves with stating that we eagerly long for the subsequent parts, as we consider it the most delightful—we may truly say fascinating—work it has been our lot to meet with for a very long time. We give this particular passage because it is new as well as strikingly true, and will serve to shew how much the world has lost in the conversations and casual observations of Burns not having been preserved by some discriminating person. Indeed, there is great reason to believe that the best sentiments of that remarkable man have perished.

“ While yet a school-boy, I enjoyed an opportunity of hearing, in my father’s manse, a conversation between the poet Burns and another poet, my near relation, the amiable Blacklock. The subject was the fidelity of the Dog. Burns took up the question with all the ardour and kindly feeling with which the conversation of that extraordinary man was so remarkably embued. The anecdotes by which it was illustrated have long escaped my memory ; but there was one sentiment expressed by Burns, with his own characteristic enthusiasm, which, as it threw a new light into my mind, I shall never forget. ‘ Man,’ said he, ‘ is the god of the Dog : he knows no other ; he can understand no other. And see how he worships him !—with what reverence he crouches at his feet—with what love he fawns upon him—with what dependence he looks up to him—and with what cheerful alacrity

he obeys him. His whole soul is wrapped up in his god ; all the powers and faculties of his nature are devoted to his service ; and these powers and faculties are ennobled by the intercourse. Divines tell us that it ought just to be so with the Christian ; but the Dog puts the Christian to shame.' The truth of these remarks, which forcibly struck me at the time, have since been verified by experience ; and often have events occurred which, while they reminded me that 'Man is the god of the Dog,' have forced from me the humiliating confession that 'the Dog puts the Christian to shame.'"—p. 308.

When the author shall have treated of the respective seasons which complete the cycle of the year, he may appropriately sum up his arguments and case in the words of a young, but most promising, poet :—

“Cyril had learned to worship and obey
 The God whose mercy gave each passing day :
 Nature beamed forth in smiles and happy glee ;
 All else rejoiced, and wherefore should not he ?
 Earth was his temple, and the boundless sky,
 Glitt'ring with gem-like stars, its canopy ;
 His books the hills and valleys ; and his prayers
 A hush of holy peace, as eloquent as theirs.
 “Who that hath wandered in the beauteous hour
 When dusky twilight shares with night her power—
 When weeping dews the thirsty valleys fill—
 And mists are rolling down each darkened hill—
 When birds are hushed—when toil and labour cease—
 When heaven and earth are universal peace—
 And, though no sound pervade the solemn air,
 The very silence is replete with prayer ;
 Breathing from flood, and field, and mountains rude,
 The voiceless orisons of gratitude ;—
 Who that hath felt this hour's deep eloquence—
 Who that hath life's most ordinary sense—
 Who that can move, think, feel, or understand—
 Can doubt the power of an Almighty Hand ?
 Go, read the stones upon the rugged hill ;
 Go, list the music of the singing rill ;
 Go, learn from ocean, forest, field, and flower,
 The infinite wisdom of Eternal Power.
 All have their language and alike upraise,
 In one continual round, Jehovah's praise.*

* *Cyril* ; a Poem. By George Wilson, Leeds. 1835.

EXTRACTS FROM FOREIGN SCIENTIFIC JOURNALS.

GEOLOGICAL.

UPON FOSSIL INFUSORIA, BY C. G. EHRENBERG.

M. C. FISCHER, the proprietor of the manufactory of porcelain at Pirkenhammer, near Carlsbad, has observed that the substance resembling siliceous concrete (*Kieselguhr*), which occurs in the peat bogs near Franzensbad, in Bohemia, "consists almost exclusively of the cases of several species of *Naviculæ*, and appears to be the fire-proof remains of the (in parts) intensely heated bottom of the ocean."

Together with this information M. Fischer sent me a piece of the siliceous mass about 2" long, 1" broad, and $\frac{3}{4}$ " high, as well as some specimens of the peat, intreating me to ascertain the animal and to publish the result. Microscopic inspection immediately confirmed the discovery of M. Fischer, that the siliceous concrete (*Kieselguhr*) of Franzensbad consisted almost exclusively of very well preserved *Naviculæ*, with which some *Bacillariæ* were intermixed, and the perfect transparency of their siliceous cases and their freedom from all organic matter, renders it probable that an unusually intense heat had purified them and amassed them together. It is not likely that they should have originated at the bottom of the sea, for the majority of the animals both in form and the relative numbers of their striae correspond very accurately with those of the *Nav. viridis*, which is found in all the fresh water about Berlin as well as elsewhere. In the specimens of peat I could also recognise *Naviculæ*, yet they were generally different, although still existing species, fewer in relative proportion, and the prevailing forms very dissimilar.

Original specimens of the siliceous concrete (*Kieselguhr*) of the Isle of France, and of Santa Fiora, in Tuscany, which were analyzed by Klaproth, shewed that they likewise consisted almost exclusively of the envelopes of Infusoria of several genera of *Bacillariæ*, yet sometimes of the same, and almost all still living, species, in conjunction with rare siliceous spicula of fresh and sea-water sponges, without any intervenient binding material. This, therefore, is an additional confirmation of Kützing's discovery that the cases of the *Bacillariæ* consist of silica.

I myself discovered, several years ago, that the ochraceous slimy substance, which sometimes covers the bottom of marshy brooks and moats, and which appears to have been considered as a deposit of the oxyde of iron, is a very delicate *Bacillaria*, which at a red heat becomes red like the oxyde of iron, and is very ferruginous, but which does not lose its form either by a red heat or upon being treated with acids, and consequently possesses a siliceous case most approaching to that of the genus *Gaillonella*. I therefore figured it last year, as *Gaillonella ferruginea* in plate 10 of my *Infusorien Codex*, which will now soon appear. All the ochre

encompassing bog-iron ore exhibits the same siliceous filaments as a deposit after the extraction of the iron. The above circumstances make it probable that the *G. ferruginea* played an important part in the formation of bog-iron, either by the direct amount of its own iron, or by the attraction of all in its vicinity.

The following are the fossil species of *Infusoria* which I have detected in the above-named substances :—

1. In the siliceous concrete (*Kieselguhr*) of Franzensbad :—1, *Navicula viridis* of very different sizes, the largest 1-9th" forming the major part of the mass ; 2, *N. gibba* ; 3, *N. fulva* ; 4, *N. Librile* ; 5, *N. striatula* ; 6, *N. viridula*—(the last two are salt-water animals, all the first are inhabitants of fresh water) ; 7, *Gomphonema paradoxum* ; 8, *G. clavatum* ; 9, *Gaillonella varians*? All fresh-water animals, and none to be distinguished from the living species.

2. In the peat of Franzensbad :—1, *Navicula granulata* is the most numerous, and was hitherto unknown ; 2, *Nav. viridis*, rare ; 3, *Baccillaria vulgaris*? 4, *Gomphonema paradoxum* ; 5, *Cocconeis undulata*. All living animals, the last found in the salt-water of the Baltic.

3. In the mountain flour (*Bergmehl*) of Santa Fiora :—1, *Synedra capitata*, forming the chief mass, an hitherto unknown form ; 2, *S. ulna* ; 3, *Navicula Librile* ; 4, *N. gibba* ; 5, *N. viridis* ; 6, *N. capitata* ; 7, *N. zebra* ; 8, *N. phænicenteron* ; 9, *N. inequalis*, all still living in fresh water ; 10, *N. viridula*, found still in salt-water ; 11, *N. granulata* ; 12, *N. foliis*, unknown species. 13, *Gomphonema clavatum* ; 14, *G. paradoxum* ; 15, *G. acuminatum*, all still found in fresh water ; 16, *Cocconema cymbiforme*, a still existing fresh-water animal ; 17, *Cocconeis undulata*, still found in salt water ; 18, *Gaillonella italica*, n. sp. ; 19, the siliceous spicula of a *Spongia* or *Spongilla*.

4. Klaproth's siliceous concrete (*Kieselguhr*) from the Isle of France exhibited :—1, *Baccillaria vulgaris*? constituting the chief mass, and is still found every where in salt water ; 2, *B. major*, an unknown species ; 3, *Navic. gibba*, still living both in fresh and salt water ; 4, *Navic. alia* sp. undetermined ; 5, *N. bifrons*. All these animals are not so well preserved as those in the former rocks, and appear, with the exception of the latter, to be salt-water animals.

The majority of these fossil *Infusoria* are still found living near Berlin, and in the waters of the Baltic near Wismar. The majority are so well preserved that they may be closely inspected. Thus, for instance, it is not only possible to count the number of the ribs, but also the six apertures of the case of *Navicula viridis*, the four apertures of *Gaillonella*, the two apertures of *Gomphonema*, &c. The rock of the Isle of France only, appears to contain a preponderance of salt-water animals. The few hitherto unknown forms may be considered very appropriately as still existing, although yet undiscovered animals. What is most striking is the preponderance of individual species which thereby characterize the different rocks,

for instance, the *Navic. viridis* in the siliceous concrete (*Kieselguhr*) of Franzensbad, *Bacillaria vulgaris* in that of the Isle of France, and *Synedra capitata* in the pulverulent silica (*Bergmehl*) of Santa Fiora. The still existing ones are more mixed, and live only about, and on plants upon which they feed.

The foliaceous triopolis of shops (*Blättertripel*) likewise showed that its mass equally consisted of *Infusoria*. The polishing slate of Bilin in Bohemia, which forms entire beds, I have discovered to consist almost exclusively of *Infusoria* which may be ascribed to the genus *Gaillonella* (*G. distans*) *Podospheonia nana*, n. sp. *Navic. scalprum*? and *Bacillaria vulgaris*, (the last are still living, salt-water animalculæ) present themselves only occasionally, the first alone is sometimes in equal abundance with the *Gaillonella*. There are found in the same polishing slate, the impressions of plants and an extinct species of fish, the *Leuciscus papyraceus* of Bronn, according to Agassiz. In the adhesive slate of *Menilmontant* I found only the doubtful traces of the altered *Gaillonella distans*. An individual of this species, which forms almost without any connecting substance the polishing slate, is 1-200''' larger, many are smaller, and one cubic inch of this stone contains 41,000,000,000 (! Eps.) of these animals.

ENTOMOLOGICAL.

ABSTRACT OF COUNT MANNERHEIM'S PAPER ON THE FAMILY OF THE COLEOPTERA BRACHELYTRA.

(From Oken's "Isis," 1836. Heft 5).

BRACHELYTRA, Latr. (*Microptera*, Grav.)

Antennæ thickened towards the apex, often moniliform, rarely serrate or clavate, and the clava never perfoliate or lamellate; the body generally elongate, narrow; elytra abbreviated, large in the majority, small in a few, and in very many covering one-half of the abdomen; the anus furnished with retractile vesicles.

A. Labrum emarginate.—TRIBE I. *Staphylinides*.

B. Labrum entire.

α. Tarsi pentamerous.

1. All the joints of the palpi distinct.

1. Antennæ inserted in front of the eyes.

* Legs simple.—TRIBE IV. *Omalides*.

** Legs spinose.—TRIBE V. *Tachinides*.

2. Antennæ inserted opposite the inner margin of the eyes.—TRIBE

VI. *Aleocharides*.

II. The last joint of the palpi concealed.—TRIBE II. *Stenides*.

6. Tarsi trimerous or tetramerous.—TRIBE III. *Oxytelides*.

TRIBE I. STAPHYLINIDES (*Pissilabra*).

The antennæ inserted either in front or between the eyes; labrum emarginate; the palpi short, filiform, all the joints distinct; the head separated from the thorax by a distinct neck; the abdomen, when alive, stretched lengthwise; the legs generally spinose; the tarsi pentamerous.

I. Labial palpi securiform.

A. The maxillary palpi filiform; the antennæ short, increasing towards the apex, with the six last joints dilated and compressed; the mandibles porrect, very forcipate, and about as long as the head.

GENUS I.—*OXYPORUS*, *Fab.* rufus, maxillosus, Schoenherrii, Mannerheimii. 4.

B. The maxillary palpi securiform; the antennæ longer, filiform, much shorter than the head, not porrect.

GENUS II.—*ASTRAPÆUS*, *Lat.* Ulmi. 1.

II. All the palpi filiform.

A. Antennæ inserted between the eyes, behind the mandibles and labrum.

1. The anterior tarsi dilated, either in both sexes or only in the males.

a. The thorax much wider than the elytra, orbicular, anteriorly sub-truncated, laterally much widened; the fourth to the tenth joints of the antennæ internally produced, serrate, the terminal one narrower and sub-acuminate.

GENUS III.—*VELLEIUS*, *Leach.* Dilatus. 1.

β. Thorax semi-orbiculato-quadrate.

a. Antennæ short, the five terminal joints broader, transverse, the last obliquely truncated above and sub-foreolate; the head and thorax smooth.

GENUS IV.—*CREOPHILUS*, *Kirby.* Maxillosus, variegatus. 2.

b. The antennæ, with the six last joints, shorter, sub-transverse, the terminal one obliquely truncated and sub-emarginate.

GENUS V.—*EMUS*, *Leach.* hirtus, nebulosus, speciosus, chrysocephalus, pubescens, murinus, inauratus. 7.

γ. Thorax longer than broad, rounded behind; the fourth to the tenth joints of the antennæ equal and lenticular.

a. The collar much narrower than the head.

* The last joint of the antennæ laterally obliquely truncated, sub-emarginate.

GENUS VI.—*STAPHYLINUS*, *Auct.* *Chrysocomus*, *erythropterus*, *castanopterus*, *stercorarius*, *dauricus*, *erythropeennis*, *bimaculatus*, *lutarius*, *cinnamopterus*, *badius*, *æneocephalus*, *chalcocephalus*, *æneicollis*, *olens*, *azurescens*, *cyaneus*, *similis*, *morio*, *sub-punctatus*, *uralensis*, *prælongus*, *erythropus*, *brunnipes*, *splendens*, *laminatus*, *tristis*, *fuliginosus*, *molochinus*, *variabilis*, *scitus*, *lævigatus*, *impessus*, *rufocinctus*, *picipes*, *maurus*, *maurorufus*, *præcox*, *attenuatus*, *boops*, *subuliformis*, *æneus*, *nitidus*, *cæruleipennis*, *decorus*, *cyanicornis*, *politus*, *fuscipennis*, *lucens*, *atratus*, *carbonarius*, *rigidicornis*, *cephalotes*, *varius*, *marginatus*, *fimetarius*, *sordidus*, *sub-fuscus*, *albipes*, *fuscus*, *nitidulus*, *discoideus*, *vernalis*, *ventralis*, *quisquiliarius*, *ochropus*, *ebeninus*, *immundus*, *sanguinolentus*, *dimidiatus*, *bipustulatus*, *opacus*, *agilis*, *varians*, *irregularis*, *fulvipes*, *micans*, *virgo*, *punctus*, *multipunctatus*, *cinerescens*. 80.

** The last joint of the antennæ entire.

GENUS VII.—*CAFIUS*, *Leach.* *xanthomelana*, *nanus*, *splendidulus*, *pumilus*, *aterrimus*, *nigritulus*. 6.

b. The collar swollen, scarcely narrower than the head.

GENUS VIII.—*PHYSETOPS.* *tartaricus*.

2. The anterior tarsi simple in both sexes.

GENUS IX.—*GYROHYPNUS*, *Kirby* (*Xantholinus*, *Dahl.*) *Longiceps*, *ochraceus*, *batychrus*, *punctulatus*, *parumguttatus*, *lentus*, *tricolor*, *pyropterus*, *fulminans*, *pilicornis*, *nigriceps*, *alternans*, *parvulus*, *linearis*, *melanocephalus*, *procerulus*, *planatus*. 17.

B. Antennæ inserted in front of the eyes, in a process of the head, behind the labrum, at the inner base of the mandibles.

1. The collar narrow; the head large, petiolated, posteriorly truncated.

GENUS X.—*EULISSUS*, *Mann.* *chalybæus*. 1.

2. The collar swollen, scarcely to be distinguished from the head.

GENUS XI.—*PLATYPROSOPUS*, *Mann.* (*Metopius*). *elongatus*. 1.

c. Antennæ inserted in front of the eyes, beyond the labrum, at the base of the mandibles.

1. Bodily slightly convex; the thorax linear, quadrangular.

a. The antennæ not geniculated; the last joint of the tarsi longer than the preceding.

GENUS XII.—*LATHROBIUM*, *Grav.* *elongatum*, *fulvipenne*, *rufipenne*, *punctulatum*, *multipunctum*, *brunnipes*, *lineare*, *minutum*, *quadratum*, *terminatum*. 10.

β. The antennæ geniculated; the first joint of the tarsi longer than the following.

GENUS XIII.—*CRYPTOBIUM*, *Mann.* *fracticorne*. 1.

2. The body depressed; the thorax trapeziform; the last joint of the tarsi longer than the preceding.

GENUS XIV.—ACHENIUM, *Leach*. Depressum. 1TRIBE II.—STENIDES (*Longipalpi*, Lat.)

The antennæ inserted either between or in front of the eyes; the labrum truncated, transverse; the maxillary palpi almost as long as the head, the last joint subulate, withdrawn, and concealed; the head with a distinct neck; the abdomen, in the living insect, generally stretched lengthwise; the legs simple; the tarsi pentamerous.

I. The antennæ inserted before the eyes, thickened towards the apex.

A. The fourth joint of the tarsi bifid.

GENUS I.—PÆDERUS, *Auct.* morio, littoralis, riparius, ruficollis, longiusculus, extensus, angustatus. 7.

B. The fourth joint of the tarsi entire.

GENUS II.—RUGILUS, *Leach* (*Stilicus*, Latr.) orbiculatus, lævigatus, fuscus, bicolor, castaneus, rubricollis. 6.

II. The antennæ inserted in front of the eyes and thickened suddenly at the apex.

GENUS III.—ERISTHETUS (*Evæsthetus*, Grav.). scaber.

III. The antennæ inserted between the eyes and thickened suddenly at the apex.

A. The ligula obsolete; the anus with two setæ.

GENUS IV.—DIANOUS, *Leach*. cærulescens. 1.

B. The ligula extended. The anus without setæ.

GENUS V.—STENUS, *Latr.* bipustulatus, maurus, juno, ater, boops, cicindeoides, oculatus, tarsalis, binotatus, bifoveolatus, buphthalmus, canaliculatus, niger, nigrutilus, geniculatus, proboscideus, pallipes, argus, fuscipes, opticus, carbonarius, circularis. 22.

TRIBE III.—OXYTELIDES (*Denticrura*, Latr.)

The antennæ inserted in front of the eyes, beneath an elevated and prominent margin of the head. The labrum transverse and entire. The palpi shorter than the head, the joints distinct and the terminal one subulate. The head with a distinct neck. The abdomen in the living insect only partially stretched lengthwise. The anterior tibiæ only compressed, and generally externally denticulato-pectinated. The tarsi trimerous or tetramerous.

I. The four anterior tibiæ denticulato-pectinated.

A. All the tibiæ entire.

GENUS I.—BLEDIUS, *Leach.*, (*Siagona*, *Prognatha*, Latr.) tricornis, taurus, unicornis, elongatus, fracticornis, castaneipennis, atricapillus, pallipes, femoralls, talpa, arenarius. 11.

B. The two or four anterior tibiæ externally excised.

α. The posterior tibiæ likewise denticulato-pectinated. The body short, much broader in front.

GENUS II.—*PLATYSTHETUS*, *Mann.* *cornutus*, *morsetans*, *nodifrons*. 3.

β. The posterior tibiæ simple. The body elongate, sublinear.

GENUS III.—*OXYTELUS*, *Grav.* *carinatus*, *piceus*, *longicornis*, *sculpturatus*, *depressus*, *Americanus*, *nitidulus*, *pusillus*, *cælatus*. 9.

II. All the tibiæ simple.

GENUS IV.—*TROGOPHLEUS*, *Mann.* *corticinus*. 1.

TRIBE IV.—OMALIDES (*Depressa*, Latr.).

The antennæ inserted in front of the eyes, beneath an elevated and prominent margin of the head. The labrum transverse entire. The palpi short, with distinct joints, the last minute, conico-acuminate. The head with a distinct neck. The abdomen, in the living insect, flat; the legs simple; the tarsi pentamerous.

I. The last joint of the tarsi elongate; the rest collectively generally equal.

A. The four anterior tarsi dilated and spongy.

GENUS I.—*PHLOEOCHARIS*, *Mann.* *Subtilissima*. 1.

B. All the tarsi simple.

1. The penultimate joint of the maxillary palpi dilated, the terminal one small and subulated.

GENUS II. *TÆNOSOMA*, *Mann.* *gracile*, *pusillum*. 2.

2. The terminal joint of the maxillary palpi conical and subacuminate.

α. Antennæ thickened towards the extremity.

a. The body short; the thorax short, transverse, not narrower behind; the elytra covering the major portion of the abdomen.

GENUS III.—*OMALIUM*, *Grav.* *boreale*, *consimile*, *rotundicolle*, *piceum*, *assimile*, *inflatum*, *pygmæum*, *sibiricum*, *quadrum*, *fimetarium*, *tectum*, *ranunculi*, *lapponicum*, *ophthalmicum*, *sorbi*, *depressum*. 16.

b. The body oblong; the thorax short, transverse, somewhat narrowed posteriorly; the abdomen generally twice as long as the elytra.

GENUS IV.—*ANTHOBIUM*, *Mann.* *rivulare*, *cæsum*, *oxyacanthæ*, *exiguum*, *pusillum*, *planum*, *viburni*, *florale*, *nigrum*, *Gyllenhalli*, *salicis*, *salicinum*, *brunneum*, *deplanatum*, *striatum*. 15.

β. The antennæ filiform; the body oblong; the thorax, both before and behind, narrowed and rounded.

GENUS V.—*ACIDOTA*, *Kirby.* *rufa*, *cruentata*, *crenata*. 3.

II. The last joint of the tarsi either as long, or a little longer, than the preceding.

- A. The last joint of the maxillary palpi sub-acuminate, slightly less than the preceding; the antennæ filiform.

GENUS VI.—LESTEVA, *Latr.* (*Anthophagus*, Grav.). *dichroa*, *testacea*, *caraboides*, *angusticollis*, *lapponica*, *alpina*, *plagiata*, *globulicollis*, *longipes*, *obscura*, *longula*, *pubescens*. 12.

- B. The maxillary palpi subulate, the penultimate joint incrassated, the apical slender, aciculate.

GENUS VII.—PROTEINUS, *Latr.* *brachypterus*, *minutus*. 2.

- C. The maxillary palpi subulate, the second joint much the largest. The antennæ clavate, the 10th and 11th joints forming a large globose knob.

GENUS VIII.—MICROPEPLUS, *Latr.* *porcatus*, *staphylinoides*. 2.

TRIBE V.—TACHINIDES (*Microcephala*, Lat.)

The antennæ inserted in front of the eyes, but never beneath a prominent or elevated margin of the head; the labrum rotundate; the palpi short, the terminal joint subulate or acuminate; the head much narrower than the thorax and inserted in it as far as the eyes; the abdomen, in the living insect, inclined; the legs spinose; the tarsi pentamerous.

- I. The body globose, narrowed posteriorly; the abdomen almost entirely withdrawn beneath the elytra; the palpi filiform, acuminate.

GENUS I.—HYPOCYPTUS, *Schüp* (*Cypha*, Kirby). *longicornis læviusculus*.

- II. The body broad, narrowed posteriorly.

- A. The palpi subulate, with the terminal joint small, aciculate; the segments of the abdomen entire.

GENUS II.—TACHYPORUS, *Grav.* *saginat*, *chrysomelinus*, *marginatus*, *abdominalis*, *nigripes*, *obtus*, *ruficollis*, *pusillus*, *nitidulus*, *pubescens*, *cellaris*, *bipunctatus*, *pedicularius*. 13.

- B. The palpi filiform, the terminal joint acuminate and longer than the preceding one; the segments of the abdomen emarginate in both sexes.

GENUS III.—TACHINUS, *Grav.* *fimbriatus*, *subterraneus*, *bipustulatus*, *humeralis*, *laticollis*, *dubius*, *rufipes*, *pullus*, *intermedius*, *fimetarius*, *marginellus*, *collaris*, *silphoides*. 13.

- III. The body elongate, sub-attenuate on both sides.

- A. The palpi subulate, the terminal joint small and aciculate.

GENUS IV.—MYCETOPORUS, *Mann.* *lepidus*, *splendidus*, *pallidulus*, *longulus*, *punctus*. 5.

- B. The palpi filiform, the terminal joint the longest and acuminate.

GENUS V.—BOLITOBIUS, *Leach.* *formosus*, *cingulatus*, *analis*, *cernuus*, *striatus*, *lunulatus*, *atricapillus*, *pulchellus*, *trimaculatus*, *pygmæus*. 10.

TRIBE VI.—ALEOCHARIDES.

The antennæ inserted between the eyes, opposite their internal margin, but not beneath the lateral margins of the head; the labrum entire, truncated; the terminal joint of the maxillary palpi conical or subulate; the head either concealed or with a distinct neck; the abdomen, in the living insect, extended lengthwise; the legs unarmed or spinose in a very few; the tarsi pentamerous.

I. The maxillary palpi elongate, the terminal joint conical and acute.

A. The antennæ incrassated in the middle, with the first joint slightly the largest.

GENUS I.—*DINARDA*, *Leach*. *dentata*. 1.

B. The antennæ slender towards the extremity, subsetaceous, the first joint very robust, the apex emarginate.

GENUS II.—*LOMECHUSA*, *Grav*. *strumosa*, *paradoxa*, *emarginata*. 3.

II. The maxillary palpi short, the terminal joint subulate.

A. The antennæ filiform, not geniculated, the joints equal; the mouth forming a rostrum; the four anterior tibiæ spinose.

GENUS III.—*GYMNUSA*, *Karsten*. *brevicollis*, *dubia*. 2.

B. The antennæ geniculated at the base, thickened towards the extremity; the mouth not rostrated; the tibiæ hirsute or pubescent, not spinose.

1. The head more or less withdrawn beneath the thorax; the body posteriorly more or less attenuate; the anterior angles of the thorax muchdepressed.

a. The antennæ short, more or less thickened in the middle, the third joint more than twice as long as the second; the body generally robust; the thorax convex, narrower than the elytra; the elytra often very short; the legs hirsute; the first joint of the tarsi slightly the longest.

GENUS IV.—*ALEOCHARA*, *Auct*. *fuscipes*, *tristis*, *bipunctata*, *intricata*, *carnivora*, *mærens*, *hæmorrhoidalis*, *lanuginosa*, *villosa*, *fumata*, *lævigata*, *brevipennis*, *pulla*, *nitida*, *bilineata*, *morion*, *exigua*. 17.

β. The antennæ short, slightly thickened towards the extremity, all the joints equal, the terminal one only the largest and oblongo-ovate; the body elongate and tapering; the thorax broader than the elytra, laterally rotundate and deflexed; the legs pubescent, the joints of the tarsi equal.

GENUS V.—*SPHENOMA*, *Mann*. *abdominale*. 1.

γ. The antennæ somewhat longer, slightly thickened towards the apex, the second and third joints nearly equal; the body narrowed posteriorly; the elytra of about the width of the thorax; the legs pubescent, the first joint of the tarsi a little longer than the following.

GENUS VI.—*OXYPODA*, *Mann.* *ruficornis*, *lividipennis*, *melanaria*, *opaca*, *umbrata*, *pellucida*, *lateralis*, *alternans*, *procerula*, *sericata*, *cingulata*, *obtuscata*. 12.

2. The head more or less exserted; the body scarcely narrowed posteriorly; the thorax generally rotundate, with the angles scarcely deflexed; the legs pubescent.

a. The five terminal joints of the antennæ suddenly thickened.

a. The body convex, narrowed anteriorly; the first joint of the tarsi a little the longest.

GENUS VII.—*MICROCERA*, *Mann.* *inflata*. 1.

b. The body sub-depressed, not narrowed; the tarsi slender, the joints sub-equal.

GENUS VIII.—*OLIGOTA*, *Mann.* *pusillima*. 1.

c. The antennæ, with the two basal joints, robust, sub-globose, the remainder setose.

GENUS IX.—*TRICHOPHYA*, *Mann.* *pilicornis*. 1.

γ. The antennæ more or less distinctly thickened towards the apex.

a. The head sub-sessile, not broader than the base of the thorax.

* The thorax of the width of the head; the body flat, linear; the antennæ moniliform; the last joint of the tarsi about equal to the rest collectively.

GENUS X.—*HOMALOTA*, *Mann.* *plana*. 1.

** The thorax transverse, globose, broader than the head, posteriorly reflexed and marginate; the body short, depressed, but revolved into a globe when frightened; the joints of the tarsi equal.

GENUS XI.—*GYROPHÆNA*, *Mann.* *nitidula*, *nana*, *affinis*, *polita*. 4.

*** The thorax broader than the head, rounded laterally; the body in the majority subdepressed, posteriorly sublinear; the first joint of the tarsi longer than the next following.

GENUS XII.—*BOLITOCCHARA*, *Mann.* *Collaris*, *lunulata*, *prolixa*, *carbonaria*, *circellaris*, *inquinalis*, *teres*, *annularis*, *analís*, *reptans*, *hæmorrhœa*, *crassicornis*, *longiuscula*, *sericans*, *luridipennis*, *castanoptera*, *socialis*, *nigritula*, *axillaris*, *atramentaria*, *aterrima*, *excavata*, *bifoveolata*, *linearis*, *angustula*, *atra*, *elongatula*, *oblonga*, *complana*, *terminalis*, *exilis*, *quisquiliarum*, *planiuscula*, *depressiuscula*, *compressa*, *tenella*, *evanescens*, *humeralis*, *limbata*, *funesta*, *depressa*, *flavipes*, *cinnamonæa*, *pumilio*, *atrata*, *boleti*, *suturalis*, *pulchella*, *elegantula*, *longicornis*, *validicornis*, *fungi*, *agaricola*, *fuscula*, *parvula*, *pallidula*, *impressifrons*. 57.

**** The thorax elongate, of about the width of the head, scarcely rounded laterally; the body elongate; the abdomen somewhat dilated posteriorly; the first joint of the tarsi, especially of the posterior legs, much longer than the next following.

GENUS XIII.—*DRUSILLA*, *Leach.* *canaliculata*, *exarata*. 2.

b. The head exerted, always broader than the base of the thorax.

* The base and apex of the thorax of equal width ; the base of the elytra not folded ; the joints of the tarsi equal.

GENUS XIV.—*CALODERA*, *Mann.* *nigrita*, *protensa*, *testacea*. 3.

** The apex of the thorax broadest ; the base of the elytra not folded ; the first joint of the tarsi longer than that next following.


GENUS XV.—*FALAGRIA*, *Leach.* *sulcata*, *obscura*, *nigra*, *picea*. 4.

*** The apex of the thorax narrow, stipitate ; the base of the elytra folded. The joints of the tarsi equal.

GENUS XVI.—*AUTALIA*, *Leach.* *rivularis*, *impressa*. 2.

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O R N I T H O L O G I C A L S O C I E T Y .

THIS Society is instituted for the purpose of forming a Collection of Water Birds in the Garden of Saint James's Park; and its operations will shortly be extended to the Waters in the other Parks.

The first object will be to exhibit a complete Collection of the British Species of the Genus *Anas* of Linnæus, from the Swan to the smallest of the Ducks. The Society will endeavour, ultimately, to obtain Specimens of every Species of hardy Aquatic Birds; Waders, Swimmers, and Divers. The whole Collection will be kept, as far as possible, in a state of nature; and, being formed in the Public Parks, will, of course, be open to the view of all Classes of the People.

It is unnecessary to point out to Ornithologists the advantages which may result from an Institution possessed of a locality so admirably suited for a Collection of Aquatic Birds, and for affording facilities for observations upon the variations and periodical change of Plumage, which are so interesting to Naturalists, and so difficult to be observed elsewhere.

It is not, however, to the Scientific alone that the Society appeals for support,—it confidently addresses itself to all lovers of the beauty of nature; to all who can appreciate the charm which the feathered tribe, that most beautiful portion of the animate Creation, are capable of lending to ornamental Water.

The Society has no privileges to claim or to offer, except those of rendering a service to Science and contributing to the amusements and information of the Public. Adequately to obtain these objects, and to render the Collection worthy of the Metropolis, will require a considerable expenditure. The usual Subscription is £1. per annum, but any Donation will be received;—Presents of Desiderata will be particularly acceptable.

The Proceedings of the Society are sanctioned and approved by H.R.H. the Ranger, and by the Commissioners of Woods and Forests.

It is requested that all Presents of Birds may be addressed to the Saint James's Ornithological Society, care of Mr. BAILY, Poulterer, *Davies Street, Berkeley Square*; and that all communications to the Secretaries may be sent to R. LEMON, Esq. 6, *Stafford Row, Pimlico*.

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 Pochard or Dunbird
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We have to acknowledge the receipt of numerous Contributions, the insertion of which are unavoidably postponed for the present. To our esteemed Correspondents an apology is due for the omission of a separate Notice of their several Communications.

A Review of the second Part of the first Volume of "Transactions of the Geological Society of Pennsylvania," and Eyton's "Rarer British Birds," in our next.

The late arrival of our French and German Periodicals compel us to omit many interesting extracts from the Foreign Scientific Journals.

When our arrangements are completed, we propose devoting about four pages in each Number of "THE NATURALIST" to a Glossary of scientific terms used in Zoology. The Glossary will be paged consecutively, for the purpose of being bound in a separate volume, and will form, when concluded, a valuable Text Book.

ERRATA.—Page 6, line 28, "for what," read "for *in* what." Line 29, for "principal," read "*principle*."

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A Review of *The British Song Birds*, *The Ornithologist's Text Book*, Eyton's *Rarer Species of British Birds*, and Turton's *Angler's Manual*, are unavoidably postponed.

¶ When our arrangements are completed, we propose devoting about four pages in each Number of *The Naturalist* to a Glossary of Scientific Terms used in Zoology. The Glossary will be paged consecutively, for the purpose of being bound in a separate volume, and will form, when concluded, a valuable Text Book.

ERRATUM.—Page 47, line 23, for “vertebrated animals” read “mammiferous animals.”

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WE are compelled to postpone, until our next number, the appearance of a wood engraving, by Jewit, of an Encrinite discovered at Frome, in a very perfect state of preservation, and likewise the description of this beautiful fossil.

"On the application of the principles of induction to the investigation of the Vegetable Kingdom, and the inferences in relation to Natural Theology," by Robert Dickson, M.D., F.L.S., in our next.

¶ When our arrangements are completed, we propose devoting about four pages in each Number of *The Naturalist* to a Glossary of Scientific Terms used in Zoology. The Glossary will be paged consecutively, for the purpose of being bound in a separate volume, and will form, when concluded, a valuable Text Book.

ERRATUM.—In part of the impression, page 140, line 20, for "*Lepidotera*" read "*Lepidoptera*."

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- "On the Nature and Uses of the Primæval Vegetation of the Earth," by Robert Dickson, M.D., F.L.S., in our next.
- We have been disappointed in our expectations of presenting our readers with a wood engraving and description of an Encrinite discovered at Frome, in the present Number; it will, however, appear in our next publication.
- The arrangements necessary for effecting a complete and comprehensive glossary of scientific terms in the several departments of Natural History, have occupied more time than we contemplated; but we hope, ere long, to be enabled to fulfil our promise.
- A Review of Swainson's "Natural History and Classification of Birds," in our next.

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An accurate Engraving of the Encrinite, to which we have previously alluded in our Notice to Correspondents, has been submitted to several celebrated Geologists, who have not been enabled to identify the species. We must, therefore, induce the possessor, (Mr. Evans, the Secretary of the Worcestershire Natural History Society), either to grant the loan of the Fossil, or favour us with a model, with the view of obtaining a correct description.

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- Professor Jink, "On the Geography of Plants in the South of Europe,"—"On the probable Origin of the Diamond"—and Review of Marshall's "*Contribution to a Natural and Economical History of the Cocoa-nut tree*," in our next.
- The communication relative to the formation of a Society in London, to promote the cultivation of British Natural History, shall receive attention when the plans are more matured. An Institution for the concentration of the labours of the British Naturalist in the Metropolis is a desideratum, and we most sincerely wish it every possible success.

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